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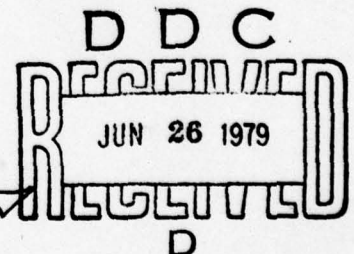
ENERGY CONVERSION

A DDC BIBLIOGRAPHY

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM										
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18. SUPPLEMENTARY NOTES Supersedes AD-A009 600 and AD-A041 500 See also AD-771 750												
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) <table border="0"> <tr> <td>* Bibliographies</td> <td>Electric Power Production</td> </tr> <tr> <td>* Energy Conversion</td> <td>Thermoelectric Power Generation</td> </tr> <tr> <td>Fuel Cells</td> <td>Magnetohydrodynamic Generators</td> </tr> <tr> <td>Power Supplies</td> <td>Research Management</td> </tr> <tr> <td>Photovoltaic Effect</td> <td>Thermionic Power Generation</td> </tr> </table> <div style="text-align: right;">(over)</div>			* Bibliographies	Electric Power Production	* Energy Conversion	Thermoelectric Power Generation	Fuel Cells	Magnetohydrodynamic Generators	Power Supplies	Research Management	Photovoltaic Effect	Thermionic Power Generation
* Bibliographies	Electric Power Production											
* Energy Conversion	Thermoelectric Power Generation											
Fuel Cells	Magnetohydrodynamic Generators											
Power Supplies	Research Management											
Photovoltaic Effect	Thermionic Power Generation											
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) <p>This bibliography contains unclassified and unlimited citations of reports giving a review of research and development pertaining to energy conversion. Four computer-generated indexes are provided: Corporate Author-Monitoring Agency, Subject, Title and Personal Author.</p>												

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SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

19. Cont.

Plasmas(Physics)
Solar Energy
Waste Management
Electrohydrodynamics
Electrochemistry
Triboelectricity
Geothermy
Nuclear Energy
Fossil Fuels

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FOREWORD

The importance of research and development in the field of energy conversion is currently being highlighted by the severe oil problems of today, both foreign and domestic. This oil problem has adversely affected the major forms of energy, gas and electricity.

This bibliography contains 408 selected unclassified and unlimited citations of reports and is a review of the research and development on *Energy Conversion*. References were taken from the Defense Documentation Center's AD data bank collection covering the period January 1962 through November 1978.

This bibliography supersedes *Energy Conversion*, AD-A009 600, DDC-TAS-76-6, dated April 1975 and AD-A041 500, DDC/BIB-77/05, dated June 1977.

Individual entries are arranged by AD number in numerical descending sequence under the heading AD Bibliographic References. Computer-generated indexes of Corporate Author-Monitoring Agency, Subject, Title and Personal Author are included.

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Defense Documentation Center

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C O N T E N T S

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PERSONAL AUTHOR P-1

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-B016 588 13/2 10/1 5/3
CIVIL ENGINEERING LAB (NAVY) PORT HUENEME CALIF

Energy Utilization of Solid Waste at Small
Naval Bases - An Economic Decision Model
and Comparison of Two Types of Systems.

DESCRIPTIVE NOTE: Technical note Jul 74-Jul 75,
DEC 76 28P Stone, P. L. ;
REPT. NO. CEL-TN-1465
PROJ: F57571
TASK: YF57571999

(U)

UNCLASSIFIED REPORT

DESCRIPTORS: *Solid wastes, *Energy conversion,
*Economic models, Decision making, Naval shore
facilities, Furnaces, Cost effectiveness, Steam
power plants, Fuels, Data acquisition, Waste
management, Downtime, Naval planning
IDENTIFIERS: PE62765N

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The decision model presented allows a quick
estimate of savings-to-investment ratio that may be
achieved by burning solid waste to generate utility
steam at military bases having 10 to 50 tons per day
(9 to 45 Mg/day) of waste fuel. The two types
of systems compared use either a rotary grate or a
controlled-air furnace for burning the waste fuel.
(Author)

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-B001 308 19/1 10/2
FAIRCHILD CAMERA AND INSTRUMENT CORP SYOSSET N Y

Design and Development of FZU-32/B Bomb
Fuze Initiator.

DESCRIPTIVE NOTE: Final rept. 23 Jun 72-15 Nov 73,
MAY 74 42P Miazza, John ;
REPT. NO. ORD-AP-31
CONTRACT: F08635-72-C-0152
PROJ: AF-2517
TASK: 251717
MONITOR: AFATL TR-74-88

(U)

UNCLASSIFIED REPORT

DESCRIPTORS: (*Bomb fuzes, *Explosives
initiators), (*Energy conversion, Air flow),
Alternators, Electric power production, Cost
effectiveness, Free fall, Turbines, Electric
fuzes, Quality control, Generators, Air intakes,
Low drag, General purpose bombs, Proximity fuzes,
Wind tunnel tests, Environmental tests, Flight
testing

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IDENTIFIERS: *FZU-32/B fuze initiators,
Design

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The primary objective of this program was to
develop a cost effective, production engineered
FZU-24/B Bomb Fuze Initiator. The
initiator is an electric generating device which,
when installed in the fuze charging well of general
purpose bombs, is capable of deriving energy from the
airstream passing the bomb in free fall and
converting the energy into electric energy suitable
for powering a bomb fuze. The objective was to be
accomplished by means of a production engineering
effort carried through the evolution of design,
fabrication, assembly, test, and evaluation. The
baseline for the design was Harry Diamond
Laboratories' Drawing No. 11716160. A
quantity of 60 units was fabricated and tested, in
accordance with the production engineered design.
After some additional redesign to correct
identified deficiencies, 220 units were fabricated.
These units were subjected to environmental, wind
tunnel, and flight testing and performance
requirements were met. The final unit design was
designated the FZU-32/B Bomb Fuze

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A065 694 20/3 7/4 10/1
UNIVERSITY COLL OF NORTH WALES BANGOR SCHOOL OF PHYSICAL
AND MOLECULAR SCIENCES

The Production of Stable Ferromagnetic
Liquids for Energy Conversion.

(U)

DESCRIPTIVE NOTE: Annual rept. no. 1, May 77-Nov 78,
NOV 78 59P Hoon, S. R. ; Popplewell, J.

; Charles, S. W. ;

CONTRACT: DAERO-77-G-037

PROJ: 1T161102BH57

TASK: 04, 00

UNCLASSIFIED REPORT

DESCRIPTORS: *Ferromagnetic materials, *Colloids,
*Energy conversion, Particle size, Iron,
Mercury, Tin, Sodium, Additives, Heat of
Fusion, Gravitational fields, Magnetization,
Viscosity, Great Britain
IDENTIFIERS: PE61102A, WU643, ASH57

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The aim of this research work has been to characterise the properties of suspensions of small single domain iron particles in mercury. These suspensions, or ferromagnetic liquids, have been stabilised against diffusional growth by tin and sodium additives. That the tin and sodium associate themselves with the iron particles to form coatings is strikingly shown in this report by resistivity and latent heat of melting experiments. The results in this report indicate that although stability of mercury based ferromagnetic liquids can be much improved by tin and sodium additives, van der Waals' forces are still responsible for the aggregation which gives rise to the undesirable high viscosities. Future work will be centered around the elimination or reduction of these attractive forces. This would thus ensure the long term stability of the fluids. It is believed that certain particle coatings will reduce the attractive van der Waals' forces.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A064 796 10/2
MAXWELL LABS INC WOBURN MA

High Power Magnetohydrodynamic System.

(U)

DESCRIPTIVE NOTE: Final technical rept. 17 May 76-15
Jun 78.

JUL 78 375P Swallow, D. W. ; Sonju, O.

K. ; Meader, D. E. ; Becker, H. ;

CONTRACT: F33615-76-C-2104

PROJ: 3145

TASK: 26

MONITOR: AFAPL TR-78-51-VOL-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A064
435.

DESCRIPTORS: *Magnetohydrodynamic generators,
*Energy conversion, Diffusers, Power supplies,
Portable equipment, Jet engine fuels, Liquid
oxygen, Combustors, Gas flow, Electrical
conductivity, Seeding, Cesium,
Performance (Engineering), Lightweight, High
power, Fabrication, Specifications
IDENTIFIERS: PE62203F, WUAFAPL31452636

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During this phase a lightweight, high performance hot gas flow train using liquid oxygen and JP-4 was designed and component modeling completed. The magnetohydrodynamic channel/diffuser performance parameters which were used as the design criteria were an output power of 30 MWe, a specific energy extraction of 1.0 MJ/kg, and a specific power density of 200 MWe/cu.m. To achieve these performance requirements, the required characteristic velocity efficiency of the combustion system was greater than 99%. During this program a limited amount of development testing was completed using a heat sink combustor and a diagnostics channel. These tests measured the combustor characteristic velocity efficiency and the gas electrical conductivity, as well as pressures, vibrations, and temperatures. The results of the development test program, which verified the design assumptions used to achieve the performance requirements, were a characteristic velocity efficiency of nearly 99% and a gas electrical conductivity at the magnetohydrodynamic channel inlet of 15 mhos/m.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A063 689

20/5

AIR FORCE AVIONICS LAB WRIGHT-PATTERSON AFB OHIO

Laser Generation by Pulsed 2.45-GHz
Microwave Excitation of CO sub 2.

(U)

DESCRIPTIVE NOTE: Final rept. 1 Jul 75-30 Sep 77,
SEP 78 7P Handy, K. G. ; Brandelik, J.

E. ;

REPT. NO. AFAL-TR-78-196

PROJ: 2001

TASK: 01

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Applied Physics,
v49 n7 p3753-3756 Jul 78.DESCRIPTORS: *Pulsed lasers, *Excitation,
Microwaves, Energy conversion, Efficiency,
Carbon dioxide lasers, Reprints

IDENTIFIERS: PE62204F, WUAFAL20010151

(U)
(U)Reprint: Laser Generation by Pulsed 2.45-GHz
Microwave Excitation of CO sub 2.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A063 386

20/9

10/2

ARTEC ASSOCIATES INC HAYWARD CALIF

Research on Non-Ideal Plasmas.

(U)

DESCRIPTIVE NOTE: Final rept. 25 May 77-24 May 78,
JUL 78 121P Baum, Dennis W. ; Gill,
Stephen P. ; Shimmin, W. Lee ; Mukherjee, D. ;

REPT. NO. FR-'76

CONTRACT: N00014-77-C-0463

PROJ: RR02401

TASK: RR0240101

UNCLASSIFIED REPORT

DESCRIPTORS: *Plasmas(Physics),
*Magnetohydrodynamic generators, *Electric power
production, Explosive forming, Energy conversion,
Performance(Engineering), Shock waves, Argon,
Xenon, Electrical conductivity

IDENTIFIERS: PE61153N, WUNR099414

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(U)Research on advanced high performance explosive
plasma sources for pulsed MHD power generators is
reported. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A063 239 21/4 13/9
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN
ILL

Fuels: State of the Art in Industrial
Utilization.

DESCRIPTIVE NOTE: Final rept.,
NOV 78 146P Kong, P. ; Lee, M. ; Hathaway,

S. ;

REPT. NO. CERL-TR-E-135

CONTRACT: MIPR-N00025-4-1041

UNCLASSIFIED REPORT

DESCRIPTORS: *Fuels. *Industrial equipment, Coal,
Refuse collection, Fuel oil, Petroleum products,
Energy conversion, Boilers, State of the art,
Handling, Storage, Industrial research,
Technology transfer

This study reviews the state of the art of industrial-scale boiler fuel use for supervisory personnel. Fuels considered were coal, petroleum fuel oil, and refuse. The sections on coal and oil deal with the basics of selection, equipment and technology for handling and storage, and equipment and technology of combustion. In addition, coal gasification processes are discussed. The section on refuse discusses the technology of converting refuse to energy (CRE). It describes in detail current major package CRE systems and considerations for co-firing refuse in boilers currently designed for firing coal. (Author)

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AD-A063 181 9/3 20/1 20/3 20/14
17/2.1 9/2 20/6 9/1
9/5

POLYTECHNIC INST OF NEW YORK BROOKLYN MICROWAVE RESEARCH
INST

Progress Report Number 43 to the Joint
Services Technical Advisory Committee.

(U)

DESCRIPTIVE NOTE: Scientific interim rept.,
NOV 78 568P Oliner, Arthur A. ;

REPT. NO. POLY-MRI-452.43-78

CONTRACT: F44620-78-C-0074, F44620-74-C-0056

PROJ: 4751

UNCLASSIFIED REPORT

DESCRIPTORS: *Electronics. *Communication and radio
systems. *Computers. *Systems engineering.
Reliability (Electronics). Electrical
engineering, Energy conversion, Electronic
equipment, Data processing, Solid state electronics,
Electromagnetism, Electronic equipment, Computer
programs, Acoustics, Optics, Quantum electronics,
Microwaves, Waveguides

(U)

IDENTIFIERS: Electrophysics, Control theory,
PE61102F

(U)

This report summarizes research accomplished under the aegis of the Microwave Research Institute and reflects the impact of the Joint Services Electronics Program on the research activities of faculty and students of the Institute. The program covers a broad spectrum ranging from basic theoretical physics, mathematics, and engineering, to experimental investigations involving basic measurements, development of devices, and materials. The report is organized into two major divisions. The first, Electrophysics, includes the topics of: Electromagnetics; Acoustics; Optics; Quantum Electronics; Solid State and Materials; Wave-Matter Interactions; and Electric Power Engineering. The second, Systems, includes the topics of: Communications; Computer and Computer-Communications Networks; Safety, Reliability and Software Engineering; Systems, Control and Networks; and Data Processing.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A062 702 10/2 20/9
 GENERAL ELECTRIC CO PHILADELPHIA PA SPACE DIV
 MHD Generator Investigations. (U)

DESCRIPTIVE NOTE: Annual rept. 1 Oct 76-31 Dec 77.
 77 762 Tate, E. ; Zauderer, Bert ;
 CONTRACT: N00014-73-C-0039

UNCLASSIFIED REPORT

DESCRIPTORS: *Magnetohydrodynamic generators,
 *Magnetohydrodynamics, Energy conversion, Test
 feasibility studies, Experimental design, Test
 facilities, Shock tunnels, Pulses, Magnetic
 fields, Excitation, High pressure, High
 temperature, Plasma generators, Explosive forming,
 Electrical conductivity, Stagnation temperature,
 Radiative transfer, Cooling (U)
 IDENTIFIERS: Electric Arc Shock tunnel (U)

The gas dynamic and plasma characteristics achievable in electric driven shock tubes are not sufficient to produce large scale self excited MHD generator operation in noble gases, primarily due to radiation cooling. It is recommended that alternate working gases be investigated and/or the East facility be upgraded with explosive drivers to achieve ultra high pressure, radiatively self-absorbing plasmas, candidate gases are cesium or gaseous or metallic compound, seeded noble gases. The requirements for self excited MHD generator operation have been established. Adequate electrical conductivity and low electrode losses are essential. It is recommended that conductivity improvements be achieved by the methods noted above. Electrode losses can be reduced by either alkali metal coated or impregnated electrodes. Serious discrepancies exist between theory and experiment of electrical conductivities of high pressure plasmas. Also the experimental data base is inadequate. Work in this area is critical to an understanding of these plasmas in MHD generators. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A062 653 13/2 10/2 15/5 8/6
 CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN
 ILL

Technical Evaluation Study: Engery
 Recovery from Solid Waste at Fort Dix, NJ
 and Nearby Civilian Communities. (U)

DESCRIPTIVE NOTE: Final rept.,

OCT 78 57P Collishaw, A. N. ; Hathaway,
 S. A. ;

REPT. NO. CERL-TR-E-136

UNCLASSIFIED REPORT

DESCRIPTORS: *Solid wastes, *Energy conversion,
 *Military facilities, *New Jersey, Economics,
 Feasibility studies, Savings, Waste management,
 Communities, Steam, Heating (U)
 IDENTIFIERS: *Landfills (U)

This study investigated the technical and economic feasibility of energy and materials recovery from solid waste presently landfilled at Fort Dix, NJ. The waste stream consists of conventional mixed solid waste generated at Fort Dix and adjacent McGuire Air Force Base (AFB). The available energy content of the waste stream is approximately 21.4 x 1,000,000 Btu/year from 18,600 tons/year mixed solid waste. Combining civilian waste from nearby communities with the military waste stream was considered. A total of 73,900 tons/year could be processed and the heat energy utilized. (U)

(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A061 071 10/2 10/3
BURNS AND ROE INC WOODBURY NYUSAF Terrestrial Energy Study. Volume
III. Part I. Summary Data Display.DESCRIPTIVE NOTE: Final rept. 1 Apr 76-1 Feb 78,
MAY 78 393P Hall, David C.; Carlson, A.; Fuller, D.; Reyer, R.; Mallner, C.;
CONTRACT: F33615-76-C-2171

PROJ: 3145

TASK: 23

MONITOR: AFAPL TR-78-19-VOL-3-PT-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, Part 2, AD-
A057 252.DESCRIPTORS: *Energy, *Energy conversion,
*Electric power production, Air Force facilities,
Ground stations, Military requirements, Air
Force planning, Selection, Economics, Costs,
Performance(Engineering), Life cycle costs,
Efficiency, Energy management, Energy storage,
Tables(Data)

IDENTIFIERS: PE62203F, WUAFAPL31452312

This report was prepared to serve as a guide for the U.S. Air Force in selecting types of energy conversion systems to meet their future ground power requirements. The electric power requirements included in this report range from 10 kilowatts to 50 megawatts. Twenty-one types of systems, conventional as well as advanced, are considered.

These include 19 types of energy conversion systems which utilize either chemical fuel, nuclear fuel, solar energy or wind energy and two types of energy storage systems which utilize electric power for recharging. Each system is characterized in terms of a set of economic, physical and performance parameters including acquisition costs, life cycle costs, size, efficiency and environmental constraints. A total of eighteen such parameters are presented for each type of system for several sets of requirements. The requirements are defined in terms of electric power level, voltage level, frequency and duration of operation corresponding to typical U.S. Air Force ground applications.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A060 709 20/5
NAVAL RESEARCH LAB WASHINGTON D CTheory and Single Wave Simulation of the
Gyrotron Traveling Wave Amplifier Operating
at Cyclotron Harmonics.

DESCRIPTIVE NOTE: Interim rept.,

AUG 78 47P Chu, K. R.; Probst, A. T.

REPT. NO. NRL-MR-3788

CONTRACT: MPR-FY-76-1970026

MONITOR: SBIE AD-E000 228

UNCLASSIFIED REPORT

DESCRIPTORS: *Masers, *Cyclotron waves, *Traveling
wave tubes, Harmonics, Mathematical models, Energy
conversion, Efficiency, Waveguides, Scaling
factors, Relativity theory, Maxwells equations,
Computerized simulation
IDENTIFIERS: Vlasov equations, *Gyrotrons, LPN-
NRL-R18-10

The cyclotron maser interaction in a waveguide structure at the harmonics of the cyclotron frequencies has been studied in detail both analytically and with numerical simulations. An idealized cold beam, single wave model has been assumed and investigated using the relativistic Vlasov and Maxwell equations. Analytical scaling relations for the growth rate and efficiency have been derived and extensive simulation data obtained. Emphasis has been placed on methods of parameter optimization for maximizing beam to wave energy conversion efficiency. Beam frame efficiencies in the vicinity of 20% and 10% have been found for the third and fourth cyclotron harmonics, respectively. These results are capable of yielding preliminary design data for gyrotron traveling wave amplifiers. However, it should be noted that a number of important practical problems such as competition between spurious modes have not been considered in the context of the present single wave analysis. Furthermore, requirements on magnetic field uniformity and electron thermal spread become more stringent as cyclotron harmonic number increases.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A060 648 5/2
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

European Scientific Notes Number 32-1, (U)

JAN 78 46P Pryce, Aubrey W. ; Hewitson,
Victoria S. ;
REPT. NO. ESN-32-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Foreign technology, *Europe,
Technology transfer, Periodicals, Aeronomy,
Aerosols, Energy conversion, Microprocessors,
Microprogramming, Lasers, Metallurgy, Computer
aided design, Labor unions, Quantum electronics,
Great Britain (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A060 599 5/2
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

European Scientific Notes. Number 32-8, (U)

AUC 78 38P Pryce, Aubrey W. ; Hewitson,
Victoria S. ;
REPT. NO. ESN-32-8

UNCLASSIFIED REPORT

DESCRIPTORS: *Foreign technology, *Europe,
Technology transfer, Periodicals, Biochemistry,
Energy conversion, Fiber optics transmission lines,
Organic materials, Command and control systems,
Human factors engineering, Space technology,
Aerodynamics, Optical equipment, Physical
chemistry, Great Britain (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A060 429 10/2 10/1
MAXWELL LABS INC WOBURN MA

Magnetohydrodynamic Lightweight Channel Development.

(U)

DESCRIPTIVE NOTE: Final rept. 28 Nov 75-31 Dec 77,
JUN 78 170P Swallow, D. W.; Sonju, O.
K.; Meader, D. E.; Heskey, G. T.;

CONTRACT: F33615-76-C-2001

PROJ: 3145

TASK: 26

MONITOR: AFAPL TR-78-41

UNCLASSIFIED REPORT

DESCRIPTORS: *Magnetohydrodynamic generators.
*Energy conversion, Lightweight, Fabrication,
Electrodes, Zirconium oxides, Metal coatings,
Copper, Shells (Structural forms), Epoxy
coatings, Filament wound construction, Diffusers,
Channel flow, Fuels, Toluenes, Oxygen,
Aircraft equipment, Performance (Engineering)
IDENTIFIERS: WUAFAPL31452635, PE62203F

(U)

A lightweight, high performance MHD channel and diffuser were designed, built, and tested. The hardware was designed for testing with toluene and oxygen. The design power level of 200 kW dc was obtained during the 125 tests. The MHD channel design was a diagonal conducting wall generator with calcia stabilized zirconia electrodes and a filament wound epoxy coated fiberglass outer shell. The diffuser design utilized thin wall copper construction with external cooling tubes. These designs resulted in a significant reduction of the masses of the channel and diffuser. The masses of the channel and diffuser were 40 kg and 24 kg, respectively, which compared favorably to previous channels and diffusers of similar performance characteristics with masses of 160 kg and 150 kg, respectively. The novel design features of the channel construction technique included the use of a filament wound, epoxy coated fiberglass structural shell, the presence of an RTV layer to provide the pressure seal, and the minimization of the use of the copper material in the electrode frames.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A059 384 10/2 10/1
NAVAL ACADEMY ANNAPOLIS MD ENERGY-ENVIRONMENT STUDY GROUP

Direct Energy Conversion Devices and Their Potential Naval Applications.

(U)

DESCRIPTIVE NOTE: Final rept. 1 Jul-15 Oct 76,
OCT 76 36P Wu, Chih;
REPT. NO. USNA-EPD-32

UNCLASSIFIED REPORT

DESCRIPTORS: *Power supplies, *Energy conversion, Fuel cells, Photovoltaic effect, Thermoelectric power generation, Thermionic power generation, Magnetohydrodynamic generators, Naval equipment, Cost effectiveness, Naval operations, Military requirements, Military applications

(U)

Direct energy conversion devices may be used as prime movers, refrigerating machines, etc. and are endowed with characteristics well suited to diverse naval applications. Despite this, not much effort has been invested in the U.S. Navy in their development. There is a real and urgent need for the initiation of substantial fundamental work in this area. Developments of thermoelectric converters, thermionic generators, photovoltaic cells, MHD systems and fuel cells are surveyed. A comparison between conventional energy conversion and direct energy conversion in size, weight, and efficiency is made. Potential utilization of these direct conversion devices to our Navy is studied.

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(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A059 131 7/1 7/4
UTAH UNIV SALT LAKE CITY DEPT OF CHEMISTRY

'Water Splitting' by Titanium Exchanged Zeolite A.

DESCRIPTIVE NOTE: Technical rept.,
SEP 79 9P Kuznicki, Steven M. ; Eyring,
Edward M. ;
REPT. NO. TR-16
CONTRACT: N00014-75-C-0796

UNCLASSIFIED REPORT

DESCRIPTORS: *Ion exchange, *Hydrogen, *Gas
generating systems, Titanium oxides, Gas
chromatography, Electron spin resonance, Photolysis,
Water, Solar energy, Energy conversion, Mass
spectrometry, Free radicals
IDENTIFIERS: Zeolite A, Zeolite Y,
WUNR051556

Visually detectable and chromatographically and mass spectrally identified hydrogen gas evolves from titanium (III) exchanged zeolite A immersed in water and illuminated with visible light. Titanium(III) exchanged zeolite X and zeolite Y do not produce this reaction. A photochemically produced, oxygenated titanium free radical (detected by electron spin resonance) not previously described is the species in the zeolite that reduces protons to molecular hydrogen. The other product of this reduction step is a nonradical, oxygenated titanium species of probable empirical formula TiO4. Heating the spent oxygenated titanium containing zeolite A under vacuum at 375 C restores over fifty percent of the free radical. Unlike previously reported systems, heating does not restore the original aquotitanium(III) species in the zeolite. Thus a means other than heating must be found to achieve a closed photochemical cycle that harnesses visible solar energy in the production of molecular hydrogen. The titanium exchanged zeolite A does, however, lend itself to a thermolysis of water previously described by Kasai and Bishop. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A059 061 10/2 10/3
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MECHANICAL
ENGINEERING

An Assessment of Thermal Energy Storage and Waste Heat Dissipation with Total Energy Systems for MIT.

DESCRIPTIVE NOTE: Master's thesis,
FEB 78 184P Palmer, James Duane ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Thermal power plants, *Energy storage, Gas turbines, Steam turbines, Internal combustion engines, Computerized simulation, Energy conversion, Cost analysis, Cooling, Waste disposal, Heating plants, Theses
IDENTIFIERS: *Total energy systems, Massachusetts Institute of Technology

Total energy systems have been proposed for installation at M.I.T. Competing power plant configurations based on three different prime movers: steam turbine, gas turbine, and internal combustion engine are analyzed to determine their coincident electrical and thermal power generation capacities. Power generation and demand profiles are compared and methods to match these profiles are formulated. Thermal energy storage is considered as a means of decoupling the thermal power production and demand. The waste heat rejected from each plant configuration is determined. Systems for dissipation of this waste heat are addressed and evaluated to determine their applicability at the M.I.T. site. Configurations incorporating each of the prime movers with an optimal waste heat dissipation system are proposed for detailed simulation of generation and cost comparison. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A058 281 10/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Simplified Fabrication of GaAs Homojunction
Solar Cells with Increased Conversion
Efficiencies.

DESCRIPTIVE NOTE: Journal article,

DEC 77 4P Fan, John C. C. ; Bozler,
Carl O. ; Chapman, Ralph L. ;

REPT. NO. JA-4802

CONTRACT: F19628-78-C-0002

PROJ: 649L

MONITOR: ESD TR-78-94

UNCLASSIFIED REPORT

Availability: Pub. in Applied Physics Letters,
v32 n6 p390-392, 15 Mar 78.

DESCRIPTORS: *Solar cells, *Gallium arsenides,
Semiconductor junctions, Energy conversion,
Efficiency, Reprints

(U)

Reprint: Simplified Fabrication of GaAs
Homojunction Solar Cells with Increased Conversion
Efficiencies.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A058 200 21/4 10/1
ARMY COMMAND AND GENERAL STAFF COLL FORT LEAVENWORTH
KANS

The Department of Defense's Alternate
Energy Policy.

DESCRIPTIVE NOTE: Final rept.,

JUN 78 81P Lucas, William J. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Master's thesis.

DESCRIPTORS: *Fuels, *Resource management, *Energy
management, Energy conversion, Military
requirements, Department of Defense, Policies,
Petroleum products, Weapon systems, National
security, Coal, Oil shales, Hydrogen, Nuclear
reactors, Solar energy, Wind, Organic materials,
Geothermy, These

(U)

This thesis examines the question of the scarcity
of petroleum-based fuels early in the Twenty-
First Century and the DOD policy and programs
to meet this shortage. Based on the fact that
petroleum fuels as we know them will not be available
early in the Twenty-First Century, this study
examines the uniqueness of the DOD's world-wide
mission and its dependence on petroleum fuels for its
main weapon systems. Because of this uniqueness, it
was concluded that the DOD needs an alternative
fuels policy independent of other governmental
agencies to meet the national security requirements.
The current DOD policy on alternative fuels for
the future is examined. This investigation revealed
that, as of January 1978, the DOD did not have a
comprehensive policy for alternative fuels.
Further, the direction of Research and
Development efforts has suffered as a result of
this lack of policy. Lastly, the study offers a
proposed policy for consideration. Recommendations
for both short- and long-range goals are proposed.
Conclusions were that an alternative fuels policy
is absolutely necessary and that a policy needs to be
established as soon as possible. (Author)

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AD-A058 200

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A057 252 10/2 10/3
BURNS AND ROE INC WOODBURY NYUSAF Terrestrial Energy Study. Volume
III. Part 2. Energy Conversion Systems
Handbook.

DESCRIPTIVE NOTE: Final rept. 1 Apr 76-1 Feb 78.
MAY 78 483p Carlson, A. ; Fuller, D. ;
Reyer, R. ; Mallner, C. ; Fogelson, S. ;
CONTRACT: F33615-76-C-2171
PROJ: 3145
TASK: 23
MONITOR: AFAPL TR-78-19-VOL-3-PT-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A055
213.

DESCRIPTORS: *Energy, *Energy conversion,
*Electric power production, Planning, Economics,
Performance(Engineering), Costs, Life cycle
costs, Efficiency, Environmental impact statements,
Energy management, Energy storage, Fuels, Fuels,
Chemicals, Radioactive isotopes, Reactor fuels,
Solar energy, Wind
IDENTIFIERS: PE63203F, WUAFAPL31452312

This report was prepared by Burns and Roe, Inc. to serve as a guide for the U.S. Air Force in selecting types of energy conversion systems to meet their future ground power requirements. The electric power requirements included in this report range from 10 kilowatts to 50 megawatts. Twenty-one types of systems, conventional as well as advanced, are considered. These include 19 types of energy conversion systems which utilize either chemical fuel, nuclear fuel, solar energy or wind energy and two types of energy storage systems which utilize electric power for recharging. Each system is characterized in terms of a set of economic, physical and performance parameters including acquisition costs, life cycle costs, size, efficiency and environmental constraints. A total of eighteen such parameters are presented for each type of system for several sets of requirements. The requirements are defined in terms of electric power level.

AD-A057 252

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AD-A056 196

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A056 196 10/1 13/2
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN
ILLEnergy Recovery from Solid Waste in the
Charleston, SC, SMSA.

DESCRIPTIVE NOTE: Final rept.,
JUN 78 73p Collishaw, A. N. ; Hathaway,
S. A. ;
REPT. NO: CERL-TR-E-131
CONTRACT: N62467-77-MP-00005

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy, *Solid wastes, *Energy
conversion, Feasibility studies, Recovery, Costs,
Resources
IDENTIFIERS: Fuel credits

This study investigated the technical and economic feasibility of establishing a single, solid waste resource-recovery facility in the Charleston, SC, Standard Metropolitan Statistical Area (SMSA). Energy was the primary resource to be recovered. The 29,700 tons/year of solid waste generated by Federal facilities in the SMSA are presently being disposed of in landfills operated by county governments. This study compared the cost of continuing solid waste disposal by landfill to the estimated cost of establishing (1) a Federal resource-recovery facility or (2) a regional resource-recovery facility. When a Federal resource-recovery facility which used solid waste generated by Federal facilities only was considered, it was determined that energy could be recovered at a rate of 19.0 x 10 to the 10th power Btu/year. The capital investment was estimated to be \$8.5 million in FY82 dollars and the Savings to Investment Ratio (SIR) was estimated at 0.8/1.0, with a payback period of more than 25 years. Because the SIR was less than 1.0, this study concluded that a Federal resource-recovery facility was not economical and should not be pursued.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A033392 20/9
STANFORD UNIV CALIF HIGH TEMPERATURE GASDYNAMICS LABMeasurements of Electrical Conductivity of
MHD Plasmas with Four-Pin Probes. (U)

DESCRIPTIVE NOTE: Rept. 15 Feb 76-14 Feb 78.

FEB 79 131P Hower, Nelson L. ;

REPT. NO. HIGL-108

CONTRACT: F44620-76-C-0024

PROJ: 2308

TASK: C1

MONITOR: AFOSR

TR-78-0847

UNCLASSIFIED REPORT

DESCRIPTORS: *Magnetohydrodynamics, *plasma
diagnostics, Plasma waves, Flow fields, Probes,
Electrical conductivity, Energy conversion, Time
dependence, Spatial distribution, Variations, High
resolution, Sensitivity, Electron density,
Electron energy

IDENTIFIERS: PE61102F, WUAFOSR2308C1

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(U)

This work describes the development of a four-pin
probe and associated electronic instrumentation for
making time and space resolved measurements of
electrical conductivity in MHD plasma flows.
Measurements were made in 2000 K atmospheric-
pressure potassium-seeded (0.1% by weight)
argon flowing at velocities between 10 and 100
meters/sec. The results show a dependence of
indicated conductivity on flow speed and probe
orientation, so that calibration is necessary for
high accuracy absolute conductivity determinations.
The probe is well suited for time and space
resolved relative conductivity fluctuation
measurements, and for continuous display of time-
averaged indicated conductivity. (Author)

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AD-A055 379

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A055 379 13/1 13/10 20/13
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIFState Variable Analysis of a Boiler
System. (U)DESCRIPTIVE NOTE: Master's thesis,
MAR 78 106P Senanikrom, Chusakdi ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Boilers, *Thermodynamics, Marine
propulsion, Heat transfer, Models, Superheating,
Temperature, Mathematical models, FORTRAN,
Computerized simulation, Energy conversion, Steam
turbines, Pressure, Theses

IDENTIFIERS: Foster Wheller ESD-III
boiler

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The state variable formulation of a Foster
Wheller ESD-III boiler is developed from
fundamental principles. The response of the model
for various input signals is determined using CSMP-
III, the IBM simulation language. The
sensitivity of the model to various coefficient
values is noted as are the characteristics of various
system states for small perturbation values.
(Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A055 213

10/2

15/5
AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB
OHIOUSAF Terrestrial Energy Study. Volume I.
Executive Summary.

(U)

DESCRIPTIVE NOTE: Final rept. 1 Apr 76-1 Feb 78.

APR 78 29P Hall, David C. ;

REPT. NO. AFAPL-TR-78-19-VOL-1

CONTRACT: E(49-28)-1013

PROJ: 3145

TASK: 23

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy consumption, *Air Force
operations, Ground support, Military requirements,
Energy conversion, Losses, Energy management,
Air Force planning

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IDENTIFIERS: PE62203F, WUAFAPL31452312

Present and future Terrestrial Power

(Electrical and Thermal) requirements of the

Air Force are summarized and categorized at both
base and subbase level, with consideration given to
applicable energy conversion technology and
potentials. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A054 992

20/4

STANFORD UNIV CALIF DEPT OF MECHANICAL ENGINEERING

Physical Phenomena in Flowing Plasmas and at
High Magnetic Fields.

(U)

DESCRIPTIVE NOTE: Final rept. 15 Feb 76-15 Feb 78.

FEB 78 24P

H. ; Mitchner, M. ; Hanson, R. K. ;

CONTRACT: F44620-76-C-0024

PROJ: 2308

TASK: C1

MONITOR: AFOSR

TR-78-0936

UNCLASSIFIED REPORT

DESCRIPTORS: *Plasmas(Physics),
*Magnetohydrodynamics, Energy conversion, Probes,
Electrical conductivity, Voltage, Combustion,
Plasma diagnostics, Laser beams, Infrared
spectroscopy, Expansion, Supersonic flow, Carbon
monoxide, Relaxation, Molecular spectroscopy
IDENTIFIERS: PE61102F, WUAFOSR2308C1

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Research is described concerning the development
and testing of four-pin probes for making time and
space resolved electrical conductivity measurements
in MHD plasmas. In a second area, the feasibility
has been demonstrated of using turnable high-
resolution laser spectroscopy for measuring
concentrations of infrared active species in
combustion gases. The third area describes
measurements of the vibrational nonequilibrium in a
supersonic expansion of CO.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A054 985 10/1 13/1 8/10
NAVAL ACADEMY ANNAPOLIS MD ENERGY-ENVIRONMENT STUDY GROUP

Dimensional Analysis of Ocean Thermal Energy Conversion Heat Exchangers.

DESCRIPTIVE NOTE: Final rept. 1 Jul 76-30 Jun 77, JUN 77 50P Nelson, Martin E.; Bock, Arthur E.;

REPT. NO. USNA-EPRD-33

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *Heat exchangers, *Oceans, Thermal power plants, Evaporators, Air water interactions, Power supplies, Temperature, Deep water, Thermoclines, Natural resources, Heat transfer coefficients

IDENTIFIERS: OTEC(Ocean Thermal Energy Conversion)

This paper points out certain historical highlights and problems connected with development of electrical energy from deep-ocean thermal differences. Natural and economic factors which have focused attention on this type of energy development are mentioned, as well as areas of support by the National Science Foundation, the Energy Research and Development Administration and the U.S. Navy. Dimensional analysis is used to develop a list of dimensionless groups of factors having significance in OTEC (Ocean Thermal Energy Conversion) heat exchangers. Certain of these groups are then evaluated for a model and prototype OTEC-Type heat exchanger using the same working fluid and experiencing the same working fluid flow rate per unit area. A discussion of the evaluation and conclusions complete the report. (Author)

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AD-A054 985

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AD-A051 336

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A051 336 7/3 20/8 7/5
BOSTON UNIV MASS DEPT OF CHEMISTRY

Photoisomerization of Bis(9-Anthryl)Methane and other Linked Anthracenes. The Role of Excimers and Biradicals in Photodimerization.

DESCRIPTIVE NOTE: Technical rept. no. 7, 1 Nov 76-31 Dec 77, MAR 78 43P Bergmark, William R.; Jones, Guilford, II; Reinhardt, Thomas E.; Halpern, Arthur M.;

CONTRACT: N00014-76-C-0442

UNCLASSIFIED REPORT

DESCRIPTORS: *Methane, *Anthracenes, *Isomerization, *Photochemical reactions, Solar energy, Energy conversion, Energy storage, Valence bands, Photochromism, Pyrolysis, Reaction kinetics, Heat of reaction, Photons, Fluorescence, Quantum chemistry, Life expectancy, Chemical radicals

IDENTIFIERS: WUNR051574

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(U)

A series of linked anthracenes capable of storing photon energy through endoergic valence photoisomerization have been studied. Photophysical and photochemical characteristics of the systems have been completely characterized by measurement of fluorescence quantum yields and lifetimes, and efficiencies for forward and reverse isomerization. The release of energy stored in photoisomers has been measured using kinetic and calorimetric techniques. From emission and lifetime data the respective roles of excimers and biradicals in anthracene photodimerization have been defined. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A051 136
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF
METEOROLOGY

Available Energy and the Maintenance of a
Moist Circulation.

DESCRIPTIVE NOTE: Final rept., 1 Nov 76-31 Oct 77,
DEC 77 29P Lorenz, Edward N. ;
CONTRACT: F19628-77-C-0026
PROJ: 2310
TASK: G2
MONITOR: AFGL TR-76-0007

UNCLASSIFIED REPORT

DESCRIPTORS: *Atmosphere models, *Energy storage,
*Moisture, Atmospheric motion, Latent heat,
Potential energy, Energetic properties, Energy
conversion, Evaporation, Precipitation
IDENTIFIERS: PE61102F, WUAFGL2310G2AA

Moist available energy is defined as the amount by which the potential plus internal (including latent) energy of a given atmospheric mass field exceeds that of a hypothetical reference field, which can be constructed from the given field by rearranging the atmospheric mass, under reversible dry-adiabatic and moist-adiabatic processes, to minimize the potential plus internal energy. Dry available energy is equal to the amount of moist available energy which would be present in a dry atmosphere having the same temperature field as the given moist atmosphere, and is identical with available potential energy. Graphical procedures are presented for determining the moist and dry reference fields and evaluating the available energies. In general the moist available energy exceeds the dry available energy. Both heating and cooling can produce and can also destroy moist and dry available energy. Evaporation can produce moist available energy, while precipitation can destroy it. Preliminary computations based upon averages indicate that the total production of moist available energy by evaporation-precipitation is at least as great as the production by heating-cooling, and possibly much greater. (Author)

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AD-A050 429

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A050 429 15/5 13/10 10/1
ARINC RESEARCH CORP ANNAPOLIS MD

Destroyer Engineered Operating Cycle
(DDEOC) System Maintenance Analysis FF-1052
Class Power Conversion and Distribution
System SMA 111-324 Review of Experience,

SEP 77 63P Jones, P. W. ;
REPT. NO. 164F-0327-1656
CONTRACT: N00024-76-C-4319

UNCLASSIFIED REPORT

DESCRIPTORS: *Maintenance management, *Marine
engineering, *Systems engineering, *Power
distribution, *Energy conversion, *Frigates,
Switching circuits, Lighting equipment, Power
supplies, Circuit breakers, Battery chargers,
Repair, Problem solving, Corrections, Cost
analysis
IDENTIFIERS: FF 1052 class vessels

This report, the Review of Experience,
documents the historical maintenance experienced for
the FF-1052 Class Power Conversion and
Distribution System, presents an analysis of the
problems encountered, and recommends actions to
improve system material conditions.
(Author)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A050 026 3/2 10/1
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

Solar Energy for the Naval Shore
Establishment.

(U)

DESCRIPTIVE NOTE: Master's thesis.
DEC 77 246P Geibel, Bruce Burgee :

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar energy; *Naval shore facilities.
*Energy conversion, Feasibility studies, Energy
conservation, Modification, Retrofitting,
Computerized simulation, Solar cells, Photovoltaic
effect, Fossil fuels, Military requirements,
Energy management, Theses

(U)

This thesis discusses the background and extent of
the current national energy crisis, and reviews the
alternative energy sources available to the United
States Navy other than conventional fossil fuels.
An in-depth analysis is made of the advantages,
disadvantages and techniques of one of these
alternatives, solar energy conversion. The
National Solar Energy Program is reviewed, as
is the role of the Department of Defense and the
United States Navy in this program. Methods
of 'retrofitting' existing Navy facilities with
solar energy systems are discussed, as are new
construction techniques. The thesis further
contains techniques for life-cycle costing of
alternative solar energy systems, which includes
computer model programs such as BASIC Language,
F-Chart calculations, and SOLCOST calculations.
The thesis concludes with suggestions for
establishing a viable solar energy program on an
activity or individual basis. A comprehensive
reference list and bibliography is provided to
identify where technical and engineering details can
be found. (Author)

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AD-A049 552

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A049 552 13/10 13/2
CIVIL ENGINEERING LAB (NAVY) PORT HUENEME CALIF

OTEC Anchors: Selection and Plan for
Development.

(U)

DESCRIPTIVE NOTE: Final rept. May 75-Mar 77,
DEC 77 30P Valent, P. J. ; Atturio, J.
M. ;

REPT. NO. CEL-TR-859

UNCLASSIFIED REPORT

DESCRIPTORS: *Anchors(Marine), Free fall,
Emplacement, Embedding, Ocean bottom, Rock,
Ocean bottom soils, Sediments, Pile structures,
Buoyancy, Hydrodynamics, Site selection, Gulf
Stream, Shallow water, Deep oceans, Mooring,
Load distribution, Positioning
devices(Machinery), Energy conversion, Thermal
power plants, Underwater structures

(U)

IDENTIFIERS: Deadweight anchors, Design,
OTEC(Ocean Thermal Energy Conversion),
Ocean Thermal Energy Conversion, Mooring
lines

(U)

Anchor systems capable of maintaining the Ocean
Thermal Energy Conversion (OTEC) power plants
on station were identified and compared. Deadweight
anchors with base shear keys were selected as the
best choice for the more common ocean environments.
Concepts for transporting and lowering the required
deadweight anchor systems to the seafloor site are
described and their limitations noted. The
attractiveness - and technical feasibility - of using
a free-fall-emplaced deadweight anchor installation
if highlighted, pile anchors attached to a common
frame (template) were selected as the better
choice on the hard (rock) seafloors often found
in the high-energy, shallow-water areas of the Gulf
Stream. Further development of the pile anchor
system for OTEC, however, is probably not necessary
because it is expected that such hard seafloor anchor
sites are best avoided by OTEC plants. A plan for
development of the free-fall-emplaced deadweight
anchor is presented and a plan for implementation
recommended. The development plan includes
evaluation of the hydrodynamic stability of the free-
falling anchor.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD-A049 490 13/1 10/1 10/2 13/2
CIVIL AND ENVIRONMENTAL ENGINEERING DEVELOPMENT OFFICE
TYNDALL AFB FL DETACHMENT 1 (ADTC)

A Survey of Considerations for Solar Energy
Facility Applications. (U)

DESCRIPTIVE NOTE: Final rept..
DEC 77 65P Nay, Marshall W. , Jr;
REPT. NO. CEEDO-TR-77-39

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar heating, Air Force facilities,
Energy management, Solar energy, Solar collectors,
Technology forecasting, Space heaters,
Retrofitting, Cost estimates, Amortization, Air
Force planning, Fossil fuels, Resource management,
Energy consumption, Energy conversion,
Photovoltaic effect, Heat pumps, Air conditioning
equipment, Military requirements, Remote areas
IDENTIFIERS: Environmental impact (U)
(U)

The purpose of this report is to provide Air Force civil engineers some useful information for the planning and programming of solar energy systems to satisfy facility energy requirements. This report has been prepared in response to the belief that considerable interest in solar energy system technology, as well as other alternate energy schemes, is increasing at a rapid pace in the Air Force. A considerable effort is devoted to appraising the current status of fossil fuel energy resources in order to establish the need for expanded work in developing solar energy technology. The current and potential areas of application of solar energy technology are described with special attention devoted to space heating. Additionally, environmental considerations of solar energy technology are described along with the current Air Force solar energy program. This report concludes with some suggestions for establishing a solar energy program on an individual or installation basis. (Author) (U)

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AD-A048 312

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD-A048 312 11/2 10/2 11/3
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG
MISS

Identification of Alternative Power Sources
for Dredged Material Processing
Operations. (U)

DESCRIPTIVE NOTE: Final rept..
NOV 77 136P Parker, C. E. ; Pal, D. ;
Vodnaska, K. F. ; Ciani, J. B. ;
REPT. NO. WES-TR-D-77-32

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Includes Appendices A-E.

DESCRIPTORS: *Dredged materials, *Processing,
*Power supplies, *Wind, Solar energy, Hydraulic
power, Energy conversion, Electric power production,
Dredging, Water, Silt, Sand, Gravel, Clay,
Removal (U)
(U)

IDENTIFIERS: Wind power (U)

This report provides a basis for selecting alternative, renewable power sources specifically for operating dredged material processing systems. A dredged material processing system is designed to:
(1) extract sand and gravel for commercial use,
(2) remove silt and clay from water to meet quality restrictions on return water, and (3) dewater the residual silt and clay to reduce volume and provide a usable foundation for later land use. Currently, processing of dredged material usually consists of holding the hydraulically pumped slurry in a diked containment area and pumping or draining off the water after settlement of the suspended material. Subsequent natural drying by sun and wind presents a problem if the material is a fine-grained silt or clay. The scope of the assigned task was to provide a screening and selection procedure for the engineer designing a dredged material processing system in order to decide which natural form of energy (or combination), if any, should be chosen to power the system. Alternative power can be provided in several forms. The following were considered in this study: (1) Wind power, driving pumps and electric generators, (2) Solar radiation converted to thermal and electrical energy. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A047 636 4/1
HILL (ROBERT D) MONTECITO CALIF
Energy Dissipation in Lightning.

(U)

DESCRIPTIVE NOTE: Interim rept.,
DEC 76 3P Hill, Robert D. ;
CONTRACT: N00014-74-C-0021

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Geophysical
Research, v82 n31 p4967-4968, 20 Oct 77.

DESCRIPTORS: *Lightning. *Energy conversion,
Dissipation, Energy, Intensity, Variations,
Channels, Corrections, Reprints

(U)

An explanation of existing differences between
experimental and theoretical values of the energy
dissipated per unit length of lightning stroke
channel is given in terms of erroneous
standardization of the lightning intensity using long
spark energy dissipations. A revised experimental
value of approximately 10,000 J/m, which agrees
with theory, is suggested. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A044 908 5/3 5/1 10/1 12/2
STANFORD UNIV CALIF SYSTEMS OPTIMIZATION LAB

The Stanford PILOT Energy/Economic
Model.

(U)

DESCRIPTIVE NOTE: Technical rept.,
JUL 77 50P Connolly, T. J. ; Dantzig, G.
B. ; Parikh, S. C. ;
REPT. NO. SOL-77-19
CONTRACT: N00014-75-C-0865, NSF-MCS-76-20019

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Also prepared under Contract EY-
76-S-03-0326.

DESCRIPTORS: *Energy management, *Economic models,
*Linear programming, Technology forecasting,
Energy conversion, Management planning and control,
United States Government, Policies, Energy
consumption, Decision making, Resource management,
Nuclear energy, Coal, Petroleum products,
International trade, Economic analysis, Dynamic
programming, Flow charting, Operations research
IDENTIFIERS: PILOT Energy Modeling Project,
Demand(Economics), Living standards,
Scenarios, WUNR047143

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The PILOT Energy Modeling Project is
concerned with: (1) performing modeling and
methodology research dealing with construction and
solution of reasonably large scale mathematical
programming models of energy/economic systems;
(2) using modeling research towards analysis of
some of today's important energy questions; and
(3) using the modeling and methodology to
construct better models for improved analysis of
tomorrow's important energy questions. At the core
of this project is the development of a multisector,
intertemporal linear programming modeling system that
describes in physical terms many of the technological
interactions within and across the sectors of the
American economy. The general aim of the modeling
effort is to permit studies to assess (1) how
specific energy policies will affect the energy
supply/demand picture and (2) how the physical
capacity of the economy over the next 30-35 years to
provide goods and services to its populace could be
affected by changes in energy supply.

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AD-A047 636

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AD-A044 908

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
 AD-A044 814 15/3 10/1
 CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN
 ILL

Recovery of Energy from Solid Waste at Army
 Installations.

(U)

DESCRIPTIVE NOTE: Technical Manuscript,
 AUG 77 58P Hathaway, S. A. ;
 REPT. NO. CERL-Technical-Ms-E-118
 PROJ: 4A762731AT41
 TASK: T6

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy management, *Energy conversion,
 *Solid wastes, Incinerators, Heat, Recovery,
 Field equipment, Military facilities, Military
 requirements, Modular construction, Packaging
 IDENTIFIERS: Refuse derived fuel, WU011, AST41,
 PE62731A

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This paper provides a technical overview of the
 current status of solid waste-to-energy conversion
 systems scaled for use on Army fixed facilities and
 installations. Attention is given to modular
 (package) and field-erected heat recovery
 incineration systems and to using refuse-derived fuel
 (RDF) in existing steam generation plants. It is
 shown that most available systems have evolved as an
 art and not as products of basic scientific inquiry.
 The proper performance of many marketed systems
 cannot be guaranteed because neither long term
 operational data nor reproducible experimental
 information for design exists. Critical research
 areas in waste characterization, heat recovery
 incineration, and use of RDF are discussed, and
 accelerated scientific inquiry within each area is
 encouraged on a priority basis. (Author)

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AD-A044 814

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AD-A043 951

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
 AD-A043 951 13/1 10/1 3/2
 LITTLE (ARTHUR D) INC CAMBRIDGE MASS

Solar Air - Conditioning Study.

(U)

DESCRIPTIVE NOTE: Final rept.,
 APR 77 149P Merriam, Richard ;
 REPT. NO. ADL-C-79679
 CONTRACT: N68305-76-C-0029
 PROJ: F57571
 TASK: ZF57571001
 MONITOR: CEL CR-77.018

UNCLASSIFIED REPORT

DESCRIPTORS: *Air conditioning equipment, *Solar
 energy, *Energy conversion, Cooling and ventilating
 equipment, State of the art, Life cycle costs,
 Heat transfer coefficients, Rankine cycle,
 Desiccants, Dehumidifiers, Refrigerants,
 Storage, Silica gel, Solar collectors,
 Buildings, Climate, Heat pumps
 IDENTIFIERS: PE62765N

(U)

(U)

The state-of-the-art of solar cooling is evaluated
 to determine the near term performance potentials and
 life-cycle costs of the most promising approaches.
 The heat actuated absorption cycle, Rankine
 cycle, and desiccant dehumidification cycle are
 examined. The principles of operation are
 described, performance coefficients are reviewed,
 operating constraints are examined, and the
 commercial status of each approach is evaluated. An
 analysis of the major solar cooling demonstrations
 (as of 1976) is carried out. Savings-to-
 investment ratios are calculated for solar cooling
 systems in buildings in seven locations within the
 United States. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD-A043 039 13/2
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF NUCLEAR
ENGINEERING

Energy Production by Solid Waste
Incineration.

(U)

DESCRIPTIVE NOTE: Final rept. Jun 76-Apr 77,
APR 77 34P Goldman, Steven B. ; Best,
Frederick R. ; Golay, Michael W. ;
CONTRACT: DAAK02-74-C-0308
PROJ: 4A762731AT41
TASK: T6
MONITOR: USAFESA-RT 2036

UNCLASSIFIED REPORT

DESCRIPTORS: *Solid wastes, Incinerators, Energy
conversion, Energy, Energetic properties,
Combustion, Production, Disposal, Furnaces,
Electric power production, Steam
IDENTIFIERS: WU013, AST41, PEG2731A

(U)

The purpose of this study is to assess the
potential of utilizing solid waste as a viable source
of energy. A technical description of the process
is given, followed by a detailed economic analysis.
Finally, the applicability of such a facility for
U.S. Army installations is presented.
(Author)

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AD-A043 039

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AD-A042 584

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD-A042 584 3/2 10/1
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

Efficiencies of Various Methods for Solar
Energy Conversion,

(U)

JUN 77 34P Soper, W. G. ;
REPT. NO. ONRL-R-6-77

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar energy, *Energy conversion,
Solar cells, Heat engines, Efficiency, Hydrogen,
Thermochemistry
IDENTIFIERS: Water splitting process, Thermal
decomposition

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Three methods are examined for converting solar
energy to electricity or shaft work: heat engines,
thermal decomposition of water to produce hydrogen
and solar cells. Maximum efficiencies of conversion
are found to lie between 20% and 50%. For most
applications, the heat engine is superior to the
water splitting process. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A042 578 13/1 10/1 21/2 13/2
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN
ILL

Technology Evaluation of Army-Scale Waste-
to-Energy Systems. (U)

JUL 77 85P Hathaway, S. A. ; Dealy, R.

REPT. NO. CERL-IR-E-110
PROJ: 4A762719AT41
TASK: T6

UNCLASSIFIED REPORT

DESCRIPTORS: *Waste management, *Energy conversion,
*Fuels, *Incinerators, Pyrolysis, Anaerobic
processes, Digestion(Biology), Gases, Liquids,
Waste recycling, Solid wastes, Shredding,
Military facilities, Army, Furnaces, Boilers,
Modular construction, Compatibility, Fluidized bed
processes, Combustion, Methane, Earth cells,
Recovery, Energy management, State of the art,
Technology, Assessment, Arm, planning
IDENTIFIERS: Refuse derived fuels, Anaerobic
digestion, Supplementary fields, Stokers,
Design, Mass burning, WU011, AST41,
PE62719A (U)

This investigation evaluated current and emerging technologies for the converting waste to energy in applications scaled for use on Army fixed facilities and installations. Technologies reviewed include: mass burning of wastes in package (modular) and field-erected systems; use of refuse-derived fuel (RDF) in new combustion capital and as a supplementary fuel in existing Army-scale central steam generators; pyrolytic conversion of waste to a gaseous and liquid fuel; and anaerobic digestion of wastes to a fuel gas. The report includes application of a rating system for candidate technologies which considers dependability, practicability, conservation, environmental compatibility, economics, and length of operational history. Use of package waste-to-energy systems and use of RDF as a supplementary boiler fuel are treated in detail. Fully satisfactory methods of surveying installation solid waste to determine energy-recovery system design points are lacking, (U)

AD-A042 578

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AD-A041 500

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A041 500 10/1 10/2
DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA
ILL

Energy Conversion. (U)

DESCRIPTIVE NOTE: Report Bibliography Jan 73-Jan 77.
JUN 77 313P

REPT. NO. DDC/BIB-77/05

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *Energy management,
*Energy, *Bibliographies, Energy storage,
Electric power production, Solar cells, Solar
energy, Solar heating, Nuclear energy, Fuel cells,
Power supplies, Magnetohydrodynamics,
Magnetohydrodynamic generators, Thermoelectric power
generation, Geothermy (U)

This bibliography contains unclassified and unlimited citations of reports giving a review of research and development pertaining to energy conversion. Four computer-generated indexes are provided: Corporate Author-Monitoring Agency, Subject, Title and Personal Author. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A040 895 10/2
XEROX CORP/ELECTRO-OPTICAL SYSTEMS PASADENA CALIFThermal Energy Storage Demonstration Unit
for Vuilleumier Cryogenic Cooler.

(U)

DESCRIPTIVE NOTE: Interim rept. 2 Jun 75-31 Aug 76,
FEB 77 157P Richter, Robert ;

REPT. NO. 2340-1-1

CONTRACT: F33615-75-C-2045

PROJ: 2126

TASK: 03

MONITOR: AFAPL TR-76-110

UNCLASSIFIED REPORT

DESCRIPTORS: *Vuilleumier cycle, *Heat pipes,
*Cryogenics, *Electric power production, Cooling,
Energy transfer, Energy storage, Fused salts,
Heat transfer, Power supplies, Heat of fusion,
Energy conversion, Eutectics, Cylinders,
Transport properties, Thermal diffusion

(U)

IDENTIFIERS: *Vuilleumier cryogenic coolers,
Thermal energy storage, Thermal space power,
WUAFAPL21260310, PE63428F

(U)

This report covers the work performed under the Thermal Energy Storage Demonstration Unit Program. The report presents the analysis, design, fabrication, and testing of a thermal energy storage demonstration unit which was to be mated to an existing Vuilleumier cooler (AFLIR) to demonstrate the concept of powering such a device directly with stored thermal energy. The Thermal Energy Storage Demonstration Unit was to be sized for delivering 1000 watts thermal power for one hour at a temperature of 1250 + or - 25 F. The ternary eutectic 64 MgF2 - 30 LiF-6 KF, which has a eutectic temperature of 1310° was selected as the thermal energy storage material. The report presents the approach and the assumptions underlying the design of the unit which incorporates a heat pipe for the transfer of energy from the thermal energy storage material to the hot cylinder of the Vuilleumier cooler. Details of the fabrication and the testing of the Thermal Energy Storage Demonstration Unit are presented.

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AD-A040 895

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AD-A040 589

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A040 589 20/4
UNIVERSAL ENERGY SYSTEMS INC DAYTON OHIOFluid Dynamic Energy Conversion and
Transfer Processes.

(U)

DESCRIPTIVE NOTE: Final rept. 18 Mar 73-30 Jun 76,
OCT 76 241P Fretter, Ernest F. ;
Krishnan K. ; Griffith, Russell W. ;

CONTRACT: F33615-73-C-4053

PROJ: 1929

TASK: 04

MONITOR: AFEDL TR-76-96

UNCLASSIFIED REPORT

DESCRIPTORS: *Fluid dynamics, *Energy transfer,
*Energy conversion, Nozzle gas flow, Thrust
augmentation, Electrodynamics, Electrohydrodynamics,
Sprays, High voltage, Supersonic nozzles,
Supersonic diffusers, Mixing, Radial flow,
Ejectors, Momentum transfer, Two dimensional flow,
Shock waves, Boundary layer, Entrainment,
Particle flux

(U)

IDENTIFIERS: WUAFEDL19290421, PE61102F

(U)

This is the final report of research performed on Contract F33615-73-C-4053. The research which included three different work areas, Electrofluid Dynamics (EFD), Multi Component Flows (MCF), and Thrust Augmentation (TA). This report presents the experimental rigs designed and built, experiments performed, and the results of this project's experiments during the contract period.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A040 142 20/9

STANFORD UNIV CALIF DEPT OF MECHANICAL ENGINEERING

Physical Phenomena in Flowing Plasmas at
High Magnetic Fields. (U)

DESCRIPTIVE NOTE: Interim scientific rept. 15 Feb 76-14
Feb 77.

FEB 77 16P Eustis, R. H. ; Mitchner, M.
; Kruger, C. H. ; Hanson, R. K. ;
CONTRACT: F44620-76-C-0024

PROJ: 2308
TASK: C1

MONITOR: AFOSR TR-77-0664

UNCLASSIFIED REPORT

DESCRIPTORS: *Magnetohydrodynamics, *Electrical
measurement, Energy conversion,
plasmas(Physics). Electrical conductivity,
ionized gases, Magnetohydrodynamic generators,
magnetic fields, Hall effect,
probes(Electromagnetic). Flow
IDENTIFIERS: WUAFOSR2308C1, PEG1102F

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A four-pin electrical conductivity probe has been
developed which is capable of providing a continuous
record of space-resolved values of the electrical
conductivity of MHD generator plasmas.
Preliminary measurements have been made of the
effect of flow velocity on the indicated electrical
conductivity. (U)

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AD-A039 702

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A039 702 7/4 10/3

BOSTON UNIV MASS DEPT OF CHEMISTRY

Photon Energy Storage in Organic
Materials: The Case of Linked
Anthracenes. (U)

DESCRIPTIVE NOTE: Technical rept. no. 6, 1 Nov 75-31
Dec 76,

MAR 77 30P Jones, Guilford, II;
Bergmark, William R. ; Reinhardt, Thomas E. ;
CONTRACT: N00014-76-C-0442

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy storage, *Energy conversion,
*Photochemical reactions, *Isomerization,
*Anthracenes, *Solar energy, Photons, Test
equipment, Calorimetry, Enthalpy, Quantum
efficiency, Valence, Isomers, Organic materials
IDENTIFIERS: WUNR051574

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Criteria for the photochemical storage of solar
energy as latent heat are outlined. Energy-storing
valence isomerizations which may be driven by
irradiation and which may be reversed by heating with
or without a catalyst are described. Data for
photoisomerization which utilize 300-500 nm radiation
with storage capacities of 50-250 cal/g and with
storage efficiencies of 5-10% are summarized. New
data concerning linked anthracenes which
photoisomerize with $\phi = 0.2-0.4$ are provided. A
photocalorimeter for the measurement of storage
enthalpies is described. New systems for the
practical conversion of solar energy are suggested.
(Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A038 802 10/1
TETRA TECH INC ARLINGTON VA

Energy Fact Book-1977.

DESCRIPTIVE NOTE: Technical rept.

APR 77 446P

REPT. NO. TETRA-A-642-77-306

CONTRACT: N00014-76-C-0239

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes Rept. no. TETRA-A-642-76-254 dated 15 Jul 76, AD-A028 284 and report dated 1975, AD-A029 331.

DESCRIPTORS: *Energy management, *Energy, *Handbooks, Fossil fuels, Natural gas, Coal, Nuclear energy, Synthetic fuels, Fuel cells, Geothermy, Nuclear power plants, Petroleum products, Hydrogen, Magnetohydrodynamics, Solar energy, Wind, Thermoelectric power generation, Oil shales, Thermal power plants, Energy conservation, Legislation, Research management, Manuals, Foreign technology, Reviews, United States, Policies, Regulations, Crude oil, Reserves(Energy), Fuel consumption, Energy conversion

IDENTIFIERS: Tar sands, Coal liquefaction, Ocean energy, Biomass energy conversion

The Energy Fact Book-1977 summarizes the present U.S. Energy situation; Energy R and D Legislation; Federal Government Energy R and D; and International Energy R and D. It includes a brief description of the various processes and developments related to hydrocarbon fuels, synthetic fuels, non-hydrocarbon energy sources and energy conservation. (Author)

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AD-A038 802

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AD-A038 612

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A038 612 10/2 20/9
AVCO EVERETT RESEARCH LAB INC EVERETT MASS

High Power Density MHD Generators.

(U)

DESCRIPTIVE NOTE: Final technical rept.;

MAR 76

CONTRACT: F33615-75-C-2047

PROJ: 3145

TASK: 26

MONITOR: AFAPL TR-76-71

UNCLASSIFIED REPORT

DESCRIPTORS: *Magnetohydrodynamic generators, *Electric power production, *Energy conversion, Lightweight, Fuels, Hydrocarbons, High power, High density

(U)

IDENTIFIERS: Fast start power systems, Direct energy conversion systems, Burst power supplies, WUAFAPL31452624, PE62203F

(U)

Operating parameters were calculated for MHD generators operating at power densities in the channel of 500 MW/cu m and with power outputs of 30 - 35 MW (nominal). Liquid-fueled generators, using hydrocarbon fuels such as JP-4 or RP-1 and oxygen, and solid fuel generators were investigated. Designs of both liquid and solid fuel generators are described, and estimates of their weights and sizes are given. Operation of generators at power densities of 1000 MW/cu m was investigated. Assessments of feasibility and risks involved in achieving high power density operation are made. A development plan for construction of flightweight high power density MHD generator power supplies is presented. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A038 600 10/2

DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA

Solar Energy.

(U)

DESCRIPTIVE NOTE: Report bibliography Jan 55-Dec 76.

APR 77 211P

REPT. NO. DDC/BIB-77/03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-771 750.

DESCRIPTORS: *Solar energy, *Energy conversion, *Bibliographies, Power supplies, Electric power production, Solar radiation, Solar heating, Solar cells, Solar generators, Solar collectors, Solar furnaces, Indexes

IDENTIFIERS: PE65801S

(U)

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This bibliography is a selection of unclassified and unlimited distribution references on Solar Energy. These citations of reports present information on performance characteristics, fabrication, development of power levels and energy conversion. Corporate Author-Monitoring Agency, Subject, Title and Personal Author are provided. (Author)

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A038 599 10/2 20/9

AVCO EVERETT RESEARCH LAB INC EVERETT MASS

MHD Power Generation (VIKING Series) with Hydrocarbon Fuels.

(U)

DESCRIPTIVE NOTE: Final technical rept. 7 Apr-15 Aug 75.

SEP 75 38P Kessler, Robert ;

CONTRACT: F33615-75-C-2047. ARPA Order-2357

PROJ: 3145

TASK: 26

MONITOR: AFAPL TR-75-97

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Rept. no. AFAPL-TR-74-47-Pt-3 dated Nov 74, AD-A004 216.

DESCRIPTORS: *Magnetohydrodynamic generators, *Electric power production, *Energy conversion, Fuels, Hydrocarbons, Combustion chambers, Burners, Cooling, Magnets, Lightweight

IDENTIFIERS: Fast start power systems, Direct energy conversion systems, Burst power supplies, WUAFAPL31452624, PE62203F

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The design, fabrication and operation of a compact high-performance burner for a two megawatt MHD generator is described. The burner was designed to operate on hydrocarbon fuels and oxygen, with cesium seed, at mass flow rates up to 2.7 kg/sec, chamber pressures up to 15 atmospheres and with rapid start capability. The burner was operated to about 90% of its design mass flow and chamber pressure. Operation at higher flow rates was restricted by limitations of the test facility. Measured heat losses at high flow rates were approximately 9% of the enthalpy input. Starting times, to full chamber pressure, were about 0.3 seconds. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A038 096 10/1 10/3
JOHNS HOPKINS UNIV LAUREL MD APPLIED PHYSICS LAB

Energy Programs at The Hopkins University
Applied Physics Laboratory.

(U)

DESCRIPTIVE NOTE: Quarterly rept. Oct-Dec 76.

DEC 76 38P

REPT. NO. APL/JHU/EOR/76-4

CONTRACT: N00017-72-C-4401

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy management, *Energy conservation, *Energy conversion, *Energy storage, *Solar cells, *Energy, *Geothermy, Environmental engineering, Oceans, Heat, Heat exchangers, Thermodynamic cycles, Silicon, Puerto Rico, Georgia, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma

IDENTIFIERS: Geothermal energy

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This volume contains a record of the activities of the Applied Physics Laboratory in the development of energy sources and energy storage methods. The larger number of articles describe APL activities that assist the Planning Office of the Division of Geothermal Energy (DGE) of ERDA. Efforts in this field are concentrated on resource assessment and utilization in DGE Region 5 (the states east of the Rocky Mountains, excluding Texas and Louisiana). The other sections describe three efforts: design of a Community Annual Storage Energy System, developmental work on polycrystalline silicon solar cells, and design and experimental work on a system to use ocean thermal energy. (Author)

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AD-A034 871

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A034 871 10/1 10/2
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

International Symposium on Wind Energy Systems, Held at Cambridge Univ., 7-9 Sep 76.

(U)

DESCRIPTIVE NOTE: Conference rept.,

DEC 76 28P

Nunn, Robert H. ;

REPT. NO. ONRL-C-31-76

UNCLASSIFIED REPORT

DESCRIPTORS: *Wind, *Energy conversion, *Power supplies, Turbines, Axes, Orientation(Direction), Configurations, Efficiency, Augmentation, Economic analysis, Experimental design, Fabrication, State of the art, Forecasting, Symposia, Planning, Great Britain

IDENTIFIERS: *Windmills

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Vertical - and horizontal-axis systems were discussed both in theory and in practice. Applications ranged from wind farms each with hundreds of megawatt units to the use of Cretan windmills to provide water for cattle. Wind energy conversion units have been operated in several configurations and the theory of their performances is sufficiently advanced to allow design for fabrication. The trends are towards larger units for municipal power systems and smaller units for domestic use. In the former case, the behavior of large wind turbines operating in large arrays, and the output (with and without storage) of several such arrays when geographically dispersed, has yet to be well understood. The field has reached a level of maturity characterized by such factors as economics, environmental impact, and public acceptance.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A034 582 20/8 20/5
STANFORD UNIV CALIF EDWARD L GINZTON LAB

Efficient IR Image Up-Conversion in Two-Photon Resonantly Pumped Cs Vapor.

(U)

AUG 76 30 Stappaerts, E. A. ; Harris,

S. E. ; Young, J. F. ;

REPT. NO. JPL-2604

CONTRACT: F19628-75-C-0046

PROJ: 5634

TASK: 09

MONITOR: RADC/ETR 76-0012

UNCLASSIFIED REPORT

Availability: Pub. in Applied Physics Letters, v29 n10 p669-670, 15 Nov 76.

DESCRIPTORS: *Optical pumping, *Atomic energy levels, Energy conversion, Resonance, Efficiency, Infrared lasers, Infrared images, Laser spots, Reprints

(U)

IDENTIFIERS: WURADC56340902, PE62204F

(U)

Resonant two-photon pumping in the Cs 6s (2)S-7s(2)S transition has been used for 2.9 micrometer to 4550 A image up-conversion. A power conversion efficiency of 20% with 1000 resolvable spots was achieved using a pump power of 8 kW. The pumping laser, Nd:lanthanum berylate, has a natural two-photon coincidence with the Cs 6s(2)S-7s(2)S transition. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A034 454 7/4 10/1 10/2
AMERICAN UNIV WASHINGTON D C

Research on Electrochemical Energy Conversion Systems.

(U)

DESCRIPTIVE NOTE: Final technical rept. 1 Jul 75-30

Jun 76,

JUL 76 33P

Robert T. ; Adams, A. ; Foley,

CONTRACT: DAAG53-76-C-0001

PROJ: 11161102A34A

TASK: 03

UNCLASSIFIED REPORT

DESCRIPTORS: *Electrochemistry, *Energy conversion, *Fuel cells, Electrolytes, Sulfonic acids, Hydrocarbons, Alcohols, Platinum, Alkanes, Chemical reactions, Inorganic acids, Oxidation, Experimental data

(U)

IDENTIFIERS: Sulfonic acid/trifluoromethane, Monohydrate/trifluoromethane sulfonic acid, PE61102A, AS34A, WU100

(U)

The project on electrochemical energy conversion system has involved two tasks: the determination of the electrochemical behavior of low molecular weight hydrocarbons and alcohols as well as other possible fuels in aqueous trifluoromethanesulfonic acid and the examination of the electro-chemical interaction of fuel cell reactants with platinum surfaces in aqueous trifluoromethanesulfonic acid. The order of reactivity for low molecular weight alkanes was determined to be C3H8 greater than C2H6 greater than n-C4H10 greater than CH4 in trifluoromethanesulfonic acid monohydrate. The same reaction order had been established previously for low molecular weight alkanes in inorganic acids such as HF, H2SO4, and H3PO4. In the case of each alkane the electrochemical activity in the sulfonic acid was significantly greater than that in phosphoric acid under the same conditions. The electrooxidation of each alkane was evaluated over the temperature range from 95 C to 135 C. The experimental data collected during this reporting

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AD-A034 454

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A034 241 10/1 10/2 8/7
BAITELLE PACIFIC NORTHWEST LABS RICHLAND WASH

The Use of Geothermal Energy at Military Installations.

(U)

DESCRIPTIVE NOTE: Research rept. 1 Sep-15 Oct 76,
DCT 76 68P McSpadden, W. R. ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *Geothermy, Military facilities, Naval shore facilities, California, Geophysics, Electric power plants, Drilling, Cost estimates, State of the art, Bibliographies

IDENTIFIERS: Hot springs, Coso geothermal area, Naval weapons center

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This report is a result of a review of eight ARPA funded projects conducted to identify (1) geothermal resources for military installations and (2) key problems for their development. Of these, four projects dealt with identification and evaluation of resources; two dealt with problems associated with the chemistry of geothermal fluids, in particular corrosion and scaling; one project was concerned with the critical problem of drilling for geothermal resources; and one was a review of the current state-of-the-art of geothermal energy development. As a result of these studies, two target areas have been identified as prime candidates for development of geothermal energy at military installations. The Coso Hot Springs, on the Naval Weapons Center at China Lake, CA, and the Marine Corps base at Twenty-nine Palms, CA. In addition, two test sites are proposed in southern Texas for research and development of geopressured systems. As of the beginning of FY77, the Coso Geothermal Site is under active exploration and development with research funding from ERDA. The objectives of these eight ARPA funded research projects have been accomplished.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A033 729 10/2
TRW DEFENSE AND SPACE SYSTEMS GROUP REDONDO BEACH CALIF
PROPULSION AND COMBUSTION SYSTEM DEPT

Study on Electrofluid Dynamic Power Generation.

(U)

DESCRIPTIVE NOTE: Final technical rept. 23 Apr 73-23
Jan 76, JUL 76 116P Huberman, M. N. ; Shelton, H.

; Krieve, W. ; Dailey, C. L. ;

CONTRACT: F33615-75-C-4085

PROJ: 7116

TASK: 01

MONITOR: AFAPL TR-76-31

UNCLASSIFIED REPORT

DESCRIPTORS: *Electrostatic generators, *Energy conversion, Channel flow, Inlets, High pressure, High voltage, Gas breakdown, Air, Hydrogen, Argon, Nitrogen, Carbon dioxide, Halogenated hydrocarbons, Colloids, Sulfur hexafluoride, Nucleation, Vapors

(U)

IDENTIFIERS: *Electrofluid dynamic energy

conversion, Mercury, WUAFAPL71160166,

PE61102F

(U)

A three-year program to develop and advance Electrofluid Dynamic (EFD) Power Generation technology is described. A range of axisymmetric EFD channel sizes from 1/12 inch operating with inlet pressures of 700 psig to the 1/48 inch channel designed to operate with 3000 psig were experimentally studied. Failure of gas-breakdown scaling laws prevented the designed 70 watts from being achieved with the small sizes at high pressure. Experimental work on the high voltage breakdown of high pressure gases including air, Hydrogen, SF6, Argon, Nitrogen CO2, and mixtures using various Freons shows a degradation of anticipated strength at about 10 to the 8th power V/M. Theoretical analyses and experimental measurements have been made on the droplet size and density in EFD generators using humid air for EFD channel sizes from 1/4 inch to 1/48 inch. Analyses also include nucleation and growth of Mercury and steam.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A033 323 10/1 10/3 10/2
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)The International Power Sources Symposium
(10th).

(U)

DESCRIPTIVE NOTE: Conference rept.,
OCT 76 13P Soper, W. G. ;
REPT. NO. ONRL-C-30-76

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy storage, *Energy conversion,
*Fuel cells, *Storage batteries, Symposia, High
energy, High density, Ground vehicles, High
temperature, Performance(Engineering),
International

(U)

A summary is given of the 10th International
Power Sources Symposium at which 48 papers were
presented. Emphasis in the review is placed upon
secondary batteries with high energy density, i.e.,
those most suitable for electrically powered
vehicles. An introductory discussion of the
principles of batteries and measures of performance
is also included. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A032 790 20/9 10/2
GENERAL ELECTRIC CO PHILADELPHIA PA SPACE DIV

MHD Generator Investigations.

(U)

DESCRIPTIVE NOTE: Annual rept. 1 Jan-30 Sep 76,
NOV 76 79P Marston, C. H. ; Tate, E. ;
Zauderer, B. ;
CONTRACT: N00014-73-C-0039

UNCLASSIFIED REPORT

DESCRIPTORS: *Magnetohydrodynamics,
*Magnetohydrodynamic generators, Energy conversion,
Feasibility studies, Experimental design, Shock
tubes, Shock tunnels, Test facilities, Pulses,
Magnetic fields, Self operation, Excitation,
High temperature, High pressure,
Plasmas(Physics), Explosive forming, Schematic
diagrams, Computer programs
IDENTIFIERS: EAST(Electric Arc Shock
Tunnel), Electric arc shock tunnel

(U)

(U)

Feasibility of self-excited MHD operation has
been shown. 8% magnetic field augmentation using an
initial field of 0.5 Tesla was obtained. The
NASA Ames EAST facility capabilities as a high
temperature, high pressure plasma source have been
mapped in detail. A channel (Ames I) has been
used on the EAST facility to check test-time,
aerodynamic performance and construction materials.
Design and construction of a preliminary (Ames
II) pulsed, self-excited, MHD generator concept
was completed.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A032 781 10/1
 MASSACHUSETTS INST OF TECH CAMBRIDGE RALPH M PARSONS LAB
 FOR WATER RESOURCES AND HYDRODYNAMICS

Power Extraction from Water Waves. (U)

AUG 75 50 Mei, Chiang C. ;
 CONTRACT: N00014-67-A-0204-0036

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Ship Research,
 v20 n2 p63-66 Jun 76.

DESCRIPTORS: *Water waves, *Energy conversion,
 Floating bodies, Cylindrical bodies, Degrees of
 freedom, Hydrodynamics, Tethering, Breakwaters,
 Damping, Reprints (U)

Salter has demonstrated experimentally that a horizontal cylinder in the free surface of water can be a device to extract energy from the incident waves. This paper proposes a design which is based on the idea of a tethered-float breakwater, and gives the theoretical design criteria for maximum power extraction from a general floating cylinder with one or two degrees of freedom. It is shown that the rate of energy extraction must be equal to the rate of radiation damping and that the floating body must be made to resonate. Then for a body with one degree of freedom, the maximum efficiency at a given frequency can be at least one half if the body is symmetrical about a vertical axis, and greater for an asymmetrical body. For a body with two degrees of freedom, all the wave power can be extracted. Hydrodynamical aspects of the controlled motion are examined. Viscous effects are ignored. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A031 709 10/2 8/10 20/13
 NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

An Optimization Study of a Low Thermal
 Potential Power System. (U)

DESCRIPTIVE NOTE: Final rept.,
 SEP 76 111p Buckingham, J. R. ; Raikes, M.
 M. ; Kelleher, M. D. ;
 REPT. NO. NPS-59Kk76091

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes report dated Jun 76,
 AD-A028 505.

DESCRIPTORS: *Electric power production, *Oceans,
 *Temperature gradients, *Thermal power plants,
 *Energy conversion, Thermodynamic cycles,
 Nonlinear programming, Systems engineering,
 Optimization, Mathematical models, Costs,
 Boilers, Condensers (Liquefiers), Pumps
 IDENTIFIERS: *Ocean thermal energy conversion (U)
 (U)

A power generating system using the low thermal potential available from the vertical temperature distribution of the ocean is analyzed as a combined engineering and economic mathematical model. The model is optimized for minimum capital cost employing a sequential unconstrained minimization algorithm. Examples of the kinds of engineering and cost information available from the model are presented. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A031 211 21/4 10/1 15/5
INTERTECHNOLOGY CORP WARRENTON VA

Feasibility of Meeting the Energy Needs of
Army Bases with Self-Generated Fuels
Derived from Solar Energy Plantations
(Appendices D, E, F, G, and H).

(U)

DESCRIPTIVE NOTE: Final rept.,
JUL 76 313P Szego, George C. ;
REPT. NO. ITC-260675
CONTRACT: DACA23-74-C-0009, ARPA Order--2630

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *Military
facilities, Plants(Botany), Anaerobic processes,
Synthetic fuels, Methanes, Cost estimates, Army
research, Army planning, Feasibility studies,
Missouri, Georgia

(U)

IDENTIFIERS: *Biological energy conversion,
Synthesis gas, Manufactured gas, Fort Leonard
Wood, Fort Benning, Sensitivity analysis

(U)

The study investigated the merit of producing fuel
at energy plantations at or near the bases. The
fuel would be used for directly fired steam
generators, hot water heaters, space heaters, and
cooking. The research examined the major
characteristics of energy plantations; analyzed
plant-matter production rates from deciduous plants;
and examined fuel consumption in stationary
facilities at major troop training centers. The
possibilities and requirements of energy plantations
at Fort Benning, Fort Leonard Wood, and at
Army bases in general were detailed.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A031 164 10/1
INTERTECHNOLOGY CORP WARRENTON VA

Feasibility of Meeting the Energy Needs of
Army Bases with Self-Generated Fuels
Derived from Solar Energy Plantations
(Appendices A, B, and C).

(U)

DESCRIPTIVE NOTE: Final rept.,
JUL 76 321P Szego, George C. ;
REPT. NO. ITC-260675-App
CONTRACT: DACA23-74-C-0009, ARPA Order--2630

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Appendices to AD-A031 163.

DESCRIPTORS: *Energy conversion, *Solar energy,
*Fuels, *Plants(Botany), *Energy storage,
Steam power plants, Fuel consumption, Military
facilities, Cooking devices, Climate, Electric
power production, Trees

(U)

IDENTIFIERS: *Energy plantation, Deciduous
trees

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A031 163 10/1
INTERTECHNOLOGY CORP WARRENTON VA

Feasibility of Meeting the Energy Needs of
Army Bases with Self-Generated Fuels
Derived from Solar Energy Plantations.

DESCRIPTIVE NOTE: Final rept..
JUL 76 149P Szego, George C. ;
REPT. NO. ITC-260675
CONTRACT: DACA23-74-C-0009, ARPA Order-2630

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Appendices, AD-A031
164.

DESCRIPTORS: *Energy conversion, *Solar energy,
*Fuels, *Plants(Botany), *Energy storage,
Synthetic fuels, Solar radiation, Natural gas,
Electric power production, Costs, Military
facilities

IDENTIFIERS: *Energy plantations

(U)
(U)

This project thoroughly investigated the possibility of collecting and storing solar radiation in plants especially grown for their fuel value as a source of fuel on U. S. Army bases. The study investigated the merit of producing this fuel at energy plantations at or near the bases. The fuel would be used for directly fired steam generators, hot water heaters, space heaters, and cooking. The research examined the major characteristics of energy plantations; analyzed plant-matter production rates from deciduous plants; and examined fuel consuming in stationary facilities at major troop training centers. The possibilities and requirements of energy plantations at Fort Benning, Fort Leonard Wood, and at Army bases in general were detailed. It was concluded that energy plantations could be feasible at approximately 15 large Army bases and that the cost of solid fuel produced from them would be approximately \$1/1 million Btu; the cost of synthetic natural gas produced from plants was determined to be approximately \$3.10 to \$4.20/1000 standard cu ft. Besides being a perpetually renewable fuel source, it was found that energy plantations could provide independence from other fuel sources, reduction in future environmental problems caused by present fuels.

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AD-A031 045

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A031 045 10/1 11/2
CIVIL ENGINEERING LAB (NAVY) PORT HUENEME CALIF

Concrete for Ocean Thermal Energy,
Conversion Structures.

DESCRIPTIVE NOTE: Final rept. Jun 75-Jan 76,
AUG 76 50P Haynes, H. H. ; Rail, R. D.
REPT. NO. CEL-TN-1448

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *Concrete, *Ocean
environments, Construction materials, State of the
art, Floating platforms, Hydrostatic pressure,
Offshore, Thermoclines, Experimental design,
Structural engineering, Endurance(General),
Heat transfer, Underwater construction
IDENTIFIERS: Ocean thermal energy conversion

(U)
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The purpose of this study was to assess the state of the art of concrete technology and construction practices as they are related to the construction of massive floating structures to house ocean thermal energy conversion (OTEC) systems. The relevant capabilities and limitations of available concrete technology and construction practices are described and deficient areas identified. Recommendations for research and development are given by which reasonable improvements can be made in the near term to provide greater assurances of long-term safe and reliable operation of the OTEC systems and to provide lower cost structures. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A030 529 10/1

NAVAL RESEARCH LAB WASHINGTON D C

Navy Applications for Terrestrial
Photovoltaic Solar Power.

(U)

DESCRIPTIVE NOTE: Interim rept.,
SEP 76 39p Statler, R. L.; Hubler, G.
K.; Guenzen, C. S.; Faraday, B. J.;
REPT. NO. NRL-MR-3363
PROJ: NRL-H01-55, RR012-06
TASK: RR012-06-41

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *Photovoltaic
effect, *Solar energy, *Solar cells, Solar
radiation, Electric power, Cost effectiveness,
Navigational aids, Communication equipment,
Surveillance

(U)

The U.S. Army Mobility Equipment
Research and Development Center (MERDC),
Fort Belvoir has been tasked by the Assistant
Secretary of Defense (Installations and
Logistics) with Energy Research and
Development Administration (ERDA) funds to
prepare a Department of Defense proposal for
installing terrestrial solar photovoltaic power in
DoD operational systems. This report describes
a survey made by the Radiation Effects Branch
of the Radiation Technology Division to
identify specific terrestrial solar photovoltaic
power applications appropriate to DoD operational
systems and facilities.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A030 370 21/1

21/4 21/5 21/7

STEVENS INST OF TECH HOBOKEN N J DEPT OF MECHANICAL
ENGINEERING

(U)

Hydrogen Energy Conversion.

DESCRIPTIVE NOTE: Semi-annual technical rept. no. 3
(volume 2) 1 Feb-31 Jul 75,
JUL 76 137p Cole, Richard B.; McAlevy,
Robert F.; III; Bentele, Max;
REPT. NO. ME-RT-75009
CONTRACT: N00014-75-C-0220, ARPA Order-2615

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A016 256.

DESCRIPTORS: *Air breathing
engines (Unconventional), *Gas turbines,
*Reciprocating engines, *Hydrogen, Energy
conversion, Internal combustion engines, Spark
ignition engines, Fuels, Cost effectiveness,
Efficiency, Power levels, Low level, Emission,
Nitroxides, Pollutants, Superchargers,
Thermodynamic cycles, Reliability, Safety,
Liquid hydrogen

IDENTIFIERS: Hydrogen engines
(U)
(U)

Air-breathing reciprocating engines and gas
turbines fueled with hydrogen are treated with
special concern for the problems each might encounter
if used on a large scale. The potential
improvements in performance of each power plant when
operated with hydrogen are determined using prior
analytical and experimental data and/or new
estimates. Particular attention is given to
factors which might improve conversion efficiency and
discount, at least partially, the relatively high
cost of hydrogen energy. Previous operating
experience and analysis of gas-turbine operation on
hydrogen are considered. Hydrogen-fueled gas
turbines are found, unlike reciprocating engines, to
offer relatively modest thermodynamic performance
gain compared with hydrocarbon fueling, though LH2
fueling has substantial potential
(undemonstrated) for power-plant efficiency or
reliability improvement through hot-section cooling
and/or heat regeneration. LH2 fuel-system problems
with transient response as well as inavailability of
suitable hardware are most evident.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A029 977 9/2 10/3
DEFENCE RESEARCH ESTABLISHMENT OTTAWA (ONTARIO)

A Computer Program to Calculate and Plot
Wind-Generated Stored Energy at Constant
Consumption.

DESCRIPTIVE NOTE: Technical note,
JUN 76 49P Valeriotte, E. M. L. ;
REPT. NO. DREO-TN-76-15

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Abstract in French.

DESCRIPTORS: *Energy storage, *Computer programs,
*Turbogenerators, Energy conversion, Wind

A computer program has been described which gives
printed and plotted outputs of the quantity of wind-
generated energy remaining in a storage system under
given conditions. The program permits simulated
variations of storage capacity, constant electrical
load and conversion efficiency by simple data
changes. Further alterations to the program itself
are detailed, to adapt it to carry out similar
calculations for wind turbines of various sizes of
construction. The program has been tested by
simulation of a hypothetical system of energy
production, storage and consumption. It is planned
that its predictions will be compared with data
obtained from an experimental program currently in
progress. (Author)

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AD-A029 977

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AD-A029 457

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A029 457 18/5 10/2
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF NUCLEAR
ENGINEERING

Conceptual Design of a Small HTGR for Total
Energy Applications at Military
Installations.

(U)

DESCRIPTIVE NOTE: Final rept.,
MAY 75 7P Shin, J. I. ; Driscoll, M.
J. ;

CONTRACT: DAAK02-74-C-0308
MONITOR: USAFESA-RT 2003

UNCLASSIFIED REPORT

DESCRIPTORS: *Nuclear power plants, *Electric power
production, *Military facilities, Gas turbines,
Reactor coolants, Reactor cores, Cost estimates,
Pressure vessels
IDENTIFIERS: *High temperature gas cooled
reactors

(U)

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A conceptual design for a small HTGR in the 100
MWe size range is described. The reactor drives
indirect closed-cycle gas turbine power conversion
units using helium as the working fluid and provides
both electricity and thermal energy (via a 380 F
hot-water utility system) to serve the projected
needs of large US Army installations and
industrial facilities in the continental US in the
post-1985 time frame. The overall system design
combines many of the proven features of the
Peachbottom I reactor, the Fort St. Vrain
HTGR core, and Oberhausen II turbomachinery.
The major unique feature is the use of an indirect
power cycle, with helium-to-helium intermediate heat
exchangers. Cost estimates are summarized which
indicate the ability of the gas turbine cycle to
discharge waste heat at a useful temperature gives
the HTGR/GT system a significant advantage over
nuclear and fossil-fired Rankine systems even
though it is inferior to LWR systems on an
electric-only basis. The fossil-fired-gas-turbine
total-energy concept is identified as its major
competitor for the present application.

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DCC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A029 066 10/2 20/9
UNIVERSAL ENERGY SYSTEMS INC DAYTON OHIO

Electrofluid Dynamics Energy Conversion Research.

(U)

DESCRIPTIVE NOTE: Final rept. 18 Mar 73-30 Jun 75.
DEC 75 128P Fretter, Ernest F.; Griffith, Russell W.;

CONTRACT: F33615-73-C-4053

PROJ: AF-7116

TASK: 711601

MONITOR: AFAPL TR-76-35

UNCLASSIFIED REPORT

DESCRIPTORS: *Electrohydrodynamics, Energy conversion, Electric fields, Test facilities, Electrodes, Performance tests

(U)

Electrofluid Dynamics (EFD) is a method of direct energy conversion in which the energy contained in a flowing gas is converted directly into electrical energy. This is generally accomplished by seeding the flowing gas with unipolar charged ions produced by a corona discharge from a sharp grounded electrode. The unipolar ions typically are deposited on particles usually produced by condensation of either a minor component (such as water vapor) of the flowing gas or by condensation of the flowing gas itself. The charged particles are then transported by viscous interaction with the flowing gas to the collector electrode of the generator where at high potential the particles release their charge to the collector. The current thus generated travels through a load to ground. Many references can be cited which describe the basic operation of various EFD generators; several are listed in the Bibliography.

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AD-A027 872

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DCC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A027 872 20/9 20/5
SCIENCE APPLICATIONS INC LA JOLLA CALIF

Studies in the Dynamics and Radiation of Laser Heated Plasmas.

(U)

DESCRIPTIVE NOTE: Final rept. 16 Oct 73-15 Aug 74.
OCT 74 45P Tamor, S.; Engebretson, A.;

REPT. NO. SAI-74-C-643-LJ

CONTRACT: DNA001-74-C-0078

PROJ: DNA-NWED-QAXP

TASK: F001

MONITOR: DNA 3887F

UNCLASSIFIED REPORT

DESCRIPTORS: *Plasmas(Physics), *Lasers, Models, Magnetohydrodynamics, Pinch effect, X rays, Krypton, Energy conversion, Ion density, Atomic spectra

(U)

Studies on non-LTE phenomena in laser heated plasma reported in DNA 3488-F have been continued. Some improvements of the LIDN rate code were made, including extension of the atomic model, and inclusion of a MHD model for the dynamics of a theta-pinch plasma. These are described in section 2. In section 3 the results of a parameter survey of X-ray conversion in Krypton are reported. It is found that there is an optimum ion density (approx. 4×10 to the 16th power cu. cm), a minimum energy deposition (approx. 1.5×10 to the 3 joule/cu. cm), and that the pulse shape is of some importance. These results are discussed in some detail. The final section of the report contains a brief outline of a suggested technique for treating of radiation transfer in strong lines and coupling them to the non-LTE rate equations. This aspect of the work is very preliminary. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A027 547 20/12
DAVID SARNOFF RESEARCH CENTER PRINCETON N JApplication of Granular Semiconductors to
Photothermal Conversion of Solar Energy.NOV 75 4P Gittleman, J. I. ;
CONTRACT: F44620-75-C-0057
PROJ: AF-9/64
MONITOR: AFOSR TR-76-0672

UNCLASSIFIED REPORT

Availability: Pub. in applied physics letters, v28
n7 p370-371, 1 Apr 76.DESCRIPTORS: *Semiconductors, *Solar energy,
*Photothermal energy, Absorbers (Materials),
Energy conversion, Reprints

(U)

A novel selective solar absorber, consisting of a dispersion of semiconductor grains in a low-dielectric-constant insulator is proposed. Calculations based on Maxwell-Garnett theory show that because of its lower reflectivity for λ < 1.5 micrometers this material is about 60% more efficient than silicon in converting solar energy to heat. Reflectivity measurements for Ge-Al₂O₃ films on aluminum agree with the predictions of the Maxwell-Garnett theory. The problems associated with the reduction to practice are discussed. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A027 105 13/1 3/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LABTransparent Heat Mirrors for Solar-Energy
Applications.NOV 75 8P Fan, John C. ; Bachner, Frank
J. ;
REPT. NO. JA-4355
CONTRACT: F19628-73-C-0002
PROJ: AF-649L
MONITOR: ESD TR-76-173

UNCLASSIFIED REPORT

Availability: Pub. in Applied Optics, v15 n4
p1012-1017 Apr 76.DESCRIPTORS: *Solar heating, *Solar radiation,
*Mirrors, *Solar energy, *Solar collectors,
Films, Transparencies, Reprints
IDENTIFIERS: Heat mirrors, Infrared
reflectivity

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(U)

Transparent heat-mirror films, which transmit solar radiation but reflect in thermal radiation, have potentially important applications in solar/thermal/electric conversion, solar heating, solar photovoltaic conversion, and window insulation. We have used rf sputtering to prepare two types of films: TiO₂/Ag/TiO₂ and Sn-doped In₂O₃. To characterize the properties of heat-mirror films for solar-energy collection, we define the parameters Alpha sub eff, the effective solar absorptivity, and Epsilon sub eff the effective ir emissivity. For our Sn-doped In₂O₃ films, the values of Alpha/Epsilon sub eff is comparable to the values of Alpha/Epsilon reported for the leading selective absorbers. Even higher values of alpha sub eff/epsilon sub eff are obtained for the TiO₂/Ag/TiO₂ films. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A026 962
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

10/1

Energy and Physics--General Conference of the
European Physical Society (3rd) Held in
Bucharest (Romania) on 9-12 September
1975.

DESCRIPTIVE NOTE: Conference rept.,
JUN 76 17P Potter, Roy F. ;
REPT. NO. ONRL-C-14-76

(U)

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy, *Meetings, Solar energy,
Energy conversion, Energy storage, Thermonuclear
energy, Transports, Rumania
IDENTIFIERS: Energy transport

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This report covers portions of most of the plenary
sessions including the opening session of the
Conference, Physics and Energy; Energy
Strategies; Maturity of Nuclear Energy; Use
of Solar Energy; New Goals and Challenges;
Photochemistry; Thermonuclear Research;
Energy, Dissipation and Structure; Transport
and Storage of Energy. Other sessions covered
are on solar energy use, transport and storage of
energy and energy research strategies.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A026 859
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

10/2

Composite Material Structures for
Thermophotovoltaic Conversion Radiator.

(U)

DESCRIPTIVE NOTE: Technical rept.,
SEP 75 26P Guazzoni, G. ; Kittl, E. ;
REPT. NO. ECOM-4351
PROJ: DA-1-T-161102-A-34-A
TASK: 1-T-161102-A-34-A-02

UNCLASSIFIED REPORT

DESCRIPTORS: *Photovoltaic effect, *Electric
generators, *Composite structures, Composite
materials, Energy conversion, Plasma spraying,
Erbium compounds, Oxides, Silicon carbides,
Thermal shock, Shock resistance
IDENTIFIERS: *Thermophotovoltaic generators

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This report covers the experimental work on the
testing and evaluation of disk-shaped erbium oxide
radiator samples fabricated by die pressing and
plasma spray coating techniques. This investigation
was performed to provide performance parameters on
the utilization of these specimen structure
compositions as improved radiator structures for
thermophotovoltaic energy conversion applications.
(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A026 346 20/9

TRW SYSTEMS GROUP REDONDO BEACH CALIF

Magnetic Field Annihilation of Impulsive Current Sheets.

(U)

DESCRIPTIVE NOTE: Final rept..

MAR 76 102P Dailey, C. L. ; Davis, H.

A. ; Lovberg, R. H. ;

CONTRACT: F44620-71-C-0031

PROJ: AF-9752

TASK: 975202

MONITOR: AFOSR

TR-76-0698

UNCLASSIFIED REPORT

DESCRIPTORS: *Plasma generators, *Annihilation reactions, *Plasma accelerators, Magnetic fields, Electric propulsion, Space propulsion, Artificial satellites, Energy conversion, Electric fields

(U)

The acceleration mechanism has been studied experimentally in several plasma accelerators which have utilized the collision of a pair of oppositely moving current sheets to set up a plasma/field configuration in which magnetic field energy is converted to plasma energy by the annihilation of antiparallel magnetic fields. Two 40 cm diameter, planar, spiral coils were used to drive the plasma by an impulsive, inductive, discharge for the initial experiments.

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AD-A026 346

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AD-A026 321

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A026 321 13/1 10/2 20/13
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

Solid State Applications of Direct Energy Conversion and Heat Pumping for a Small Automotive Vehicle.

(U)

SEP 75 141P Tsoukalas, Thomas Constantine ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Thermoelectric cooling, *Thermoelectric power generation, *Heat pumps, *Energy conversion, Passenger vehicles, Solid state electronics, Exhaust gases, Alternators, Elimination, Heat flux, Theses

IDENTIFIERS: Thompson effect, Joule effect, Passenger compartments

(U)

(U)

The feasibility of solid state application for electrical power generation and heat pumping in small automotive vehicles has been examined. A new geometric configuration for the thermoelectric couple was introduced and the heat flow problem has been solved analytically in detail. The obtained results appeared promising for future developments in this area. (Author)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A026 053 10/2 7/4
ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT COMMAND
FORT BELVOIR VA

Surface Research for Development of New
Electrocatalysts for Acid Electrolyte Fuel
Cells.

7d 15P Joebstl, Johann A. ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Electrocatalysts, *Fuel cells,
Energy conversion, Electrochemistry, Electrolytes,
Acids, Catalysts, Surface properties,
Substitutes, Platinum, Oxygen, Carbon monoxide,
Adsorption, Desorption

The mechanisms of selected electrochemical
reactions are very similar to the mechanisms of the
appropriate heterogeneous catalytic gas reactions.
Therefore heterogeneous catalytic reactions can be
utilized to screen materials for their potential
applicability as electrocatalysts in fuel cells.
Similarly, surface research on supported catalysts
supplies invaluable information of the chemical
interaction between catalyst and substrate and thus
further the development of electrocatalysts with
increased temperature stability. (Author)

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A025 922 10/3
SPECTROLAB INC SYLMAR CALIF

Low Reflectivity Solar Cells.

DESCRIPTIVE NOTE: Final rept. 31 May 74-4 Jan 76,
JAN 76 83p Stella, Paul ; Avery, James ;

Scott-Monck, John ;

REPT. NO. 380-4686F

CONTRACT: F33F15-74-C-2044

PROJ: AF-3145

TASK: 314519

MONITOR: AFAPL TR-75-98

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Antireflection coatings,
Reflectivity, Reflection, Reflectance, Etching,
Silicon, Quartz, Sodium, Potassium compounds,
Hydroxides

(U)

IDENTIFIERS: *Silicon solar cells, Solar energy
conversion, Photovoltaic conversion

(U)

Techniques for both reducing and changing specular
reflectance from silicon solar cell assemblies
(cell and cover) were developed. Mechanical
and chemical treatments of quartz cell covers yielded
surfaces that acted like nearly perfect diffusers of
incoming visible radiation. A four order of
magnitude reduction in specular reflectivity was
achieved in this manner. Selective etches and
multiple antireflection (AR) coatings were used to
reduce the total reflection from the cell. Etches
such as sodium and potassium hydroxide reduced the
total reflection over the entire silicon cell
spectrum (350-1100 nm) to below one percent, with
a corresponding increase in output current of nearly
eight percent over conventionally prepared surfaces.
Some degradation in fill factor was observed with
the etched surface so that the current increase at
the load voltage was somewhat less than at short
circuit.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A024 185 20/5
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Optically Pumped Infrared V-V Transfer Lasers.

(U)

DESCRIPTIVE NOTE: Journal article,
JUL 75 4P Kildal, Heige ; Deutsch, Thomas

F. ;

REPT. NO. JA-4531

CONTRACT: F19628-73-C-0002

PROJ: AF-649L

MONITOR: ESD TR-75-348

UNCLASSIFIED REPORT

Availability: Pub. in Applied Physics Letters,
v27 n9 p500-502, 1 Nov 75.

DESCRIPTORS: *Carbon dioxide lasers, *TEA lasers,
*Optical pumping, Vibration, Resonance,
Transfer, Nitrogen oxides, Energy conversion,
Reprints

(U)

Laser action in OCS, CO2, N2O, C2H2,
and CS2 has been obtained by resonant vibrational-
to-vibrational (V-V) energy transfer from CO
gas excited by a frequency-doubled CO2 TEA laser.
Output energies up to 0.5 mJ, energy conversion
efficiencies as high as 7%, and thresholds as low
as 0.1 mJ have been observed. (Author)

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AD-A023 824

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A023 824 10/2 8/3
TETRA TECH INC ARLINGTON VA

A Preliminary Assessment of the Tidal Power
Potential at Two Sites in the Vicinity of
Cutler, Maine.

(U)

DESCRIPTIVE NOTE: Technical rept.,

APR 76 43P

LeMehtaute, Bernard ;

REPT. NO. TETRAT-A-642-76-238

CONTRACT: N00014-76-C-0239

UNCLASSIFIED REPORT

DESCRIPTORS: *Electric power production, *Tides,
*Energy conversion, Maine, Radio stations,
Electric power plants, Cost estimates, Economic
analysis, Tidal currents, Potential energy,
Electric power transmission, Assessment
IDENTIFIERS: Cutler Maine, Machias bay, *Tidal
power plants, Site surveys

(U)

This is a preliminary assessment of Machias Bay
and Little Machias Bay near Cutler, Maine,
as potential sites for a tidal power plant to provide
electrical power for nearby Naval radio stations.
This report contains a discussion of the power
requirements and energy potential at these sites,
tidal power plant systems which might be used, and
economic considerations. The analysis consists
primarily of a comparison with the operating tidal
power plant at Rance, France. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A023 689 10/2

AMERICAN UNIV WASHINGTON D C

Research on Electrochemical Energy Conversion Systems.

(U)

DESCRIPTIVE NOTE: Technical rept. no. 7, (Final),
Oct 71-Jun 75,

DEC 75 120P

Adams, Alayne A. ;Foley,

Robert T. ;

CONTRACT: DAAK02-72-C-0084

PROJ: DA-1-T-161102-A-34-A

TASK: 1-T-161102-A-34-A-03

UNCLASSIFIED REPORT

DESCRIPTORS: *Electrochemistry, *Fuel cells,

*Energy conversion, Corrosion resistance,

Electrolytes, Phosphoric acids, Sulfonic acids,

Electrodes, Hydrocarbons, Alloys

IDENTIFIERS: Electrooxidation, Hydrocarbon air

fuel cells, Methane sulfonic acid/trifluoro, Fuel

cell electrolytes

(U)

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The research on electrochemical energy conversion system has involved work on two tasks: a search for electrolytes alternative to phosphoric acid for direct and indirect hydrocarbon-air fuel cells, and a study of the corrosion characteristics of electrolytes for intermediate-temperature hydrocarbon-air fuel cells. A tabulation of the characteristics of an ideal fuel cell electrolyte established that there were five classes of chemical compounds that could be the sources of new, improved electrolytes. One class, the fluorinated sulfonic acids, through one member of the class, trifluoromethanesulfonic acid monohydrate, was investigated in some depth. This compound, when

used as an electrolyte in hydrocarbon-air half cells, exhibits exceptional properties in comparison to conventional electrolytes such as phosphoric acid. The electrooxidation of propane and hydrogen is increased by an order of magnitude. The limiting current for the electroreduction of oxygen is increased somewhat but the open circuit potential for the air electrode is increased from 0.98 v (in phosphoric acid) to 1.13 v.

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AD-A023 417

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A023 417 10/2

GENERAL ELECTRIC CO PHILADELPHIA PA SPACE DIV

MHD Generator Investigations.

(U)

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 75,
MAR 76 130P Marston, Charles H. ;Tate,

E. ;Zauderer, Bert ;

CONTRACT: N00014-73-C-0039

UNCLASSIFIED REPORT

DESCRIPTORS: *Magnetohydrodynamic generators,
Electric power production, Closed cycle systems,
Energy conversion, Nonequilibrium flow, Pulses,
Electric power, Explosives, Plasma generators,
Energy, Magnetohydrodynamics, Explosions,
Excitation

(U)

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IDENTIFIERS: Direct energy conversion, Explosive

pulse MHD, Nonequilibrium MHD

Work during the past year has been focused on two distinct areas. Interest in the production of intense, short duration pulses of electric energy prompted investigation of a self-excited MHD generator capable of doing this job. Feasibility of the concept was established and design of the first test channel completed. Some experiments were also conducted on the non-equilibrium closed cycle MHD generator, which in 1974 achieved a record enthalpy extraction of 19.3%. The emphasis was on reducing stagnation temperature from 3520 K where the record was achieved to the 2000 K level, which is compatible with available energy sources. Both the shock tunnel and the MHD generator become more difficult to operate as temperature drops, but results are encouraging. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A023 340

10/1
TETRA TECH INC ARLINGTON VAU.S. Navy Energy Research and Development
Program Quarterly Report No. 2.

(U)

MAR 76 35P
REPT. NO. TETRAT-A-642-76-239
CONTRACT: N00014-76-C-0239

UNCLASSIFIED REPORT

DESCRIPTORS: *Naval research. *Energy conversion, Military research. Research management, Oil shales, Nuclear energy, Reviews, Abstracts
 IDENTIFIERS: Research projects, Synthetic fuels, Solar energy conversion, Geothermal energy conversion, Coal gasification, Coal liquefaction, Tar sands

(U)

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This is the second quarterly report summarizing the progress of the Navy Energy R and D program in order to provide Navy management personnel with an update on significant energy-related events. The report includes the energy related activities of the Navy Energy Natural Resources R and D Office, the Systems Commands, the Navy Research Laboratory, the Office of Naval Research and programs of interest to the Navy supported by the Energy Research and Development Administration.

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AD-A022 829

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A022 829

10/2
RAND CORP SANTA MONICA CALIFThe Potential of Indigenous Energy
Resources for Remote Military Bases.

(U)

DESCRIPTIVE NOTE: Interim rept.,
 MAR 76 141P
 F. ;Mow,C. C. ;Salter,R. G. ;
 REPT. NO. R-1-78-ARPA
 CONTRACT: DAHC15-73-C-0181, ARPA Order-189

UNCLASSIFIED REPORT

DESCRIPTORS: *Electric power production, *Energy storage, *Energy conservation, Resources, Power supplies, Solar radiation, Wind, Ocean waves, Energy conversion, Military facilities, Remote areas
 IDENTIFIERS: Indigenous energy resources

(U)

(U)

An examination of the potential of solar radiation, wind, and ocean waves to provide thermal and electrical power to standard remote military bases. Sufficient energy is shown to be available in the North Atlantic, Indian, and Pacific Oceans, and the Caribbean to satisfy average remote base power requirements. A survey of indigenous energy technologies indicates that considerable research is needed to bring wave power recovery up to the level of solar and wind systems. An analytic computer model is used to show that indigenous energy systems are extremely costly, in part because of storage requirements, and that a mix of indigenous and conventional (petroleum) systems would be far less so. Since even a combined system is shown to exceed the cost of a pure conventional power supply, use of indigenous energy is justifiable only as a means of reducing the dependence of remote bases on petroleum fuels. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A022 421 11/6 10/1
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

Hydrogen Problems in Energy Related Technology.

(U)

DESCRIPTIVE NOTE: Technical rept.,
NOV 74 25P Hirth, J. P. ; Johnson, H. M. ;REPT. NO. OSURF-4098-12
CONTRACT: N00014-75-C-0541

UNCLASSIFIED REPORT

Availability: Pub. in Corrosion, v32 n1 p3-26
Jan 76.DESCRIPTORS: *Hydrogen embrittlement, *Corrosion,
*Hydrogen, *Steel, *Energy conversion,
Geothermy, Energy storage, Energy management,
Metals, Alloys, Pipelines, Waste disposal,
Degradation, Energy, Technology, Reprints

(U)

A survey of hydrogen degradation problems in energy related systems is presented. Nine separate phenomenological classifications of such degradation are presented. Key areas of unsolved problems and needed research are specified. Hydrogen embrittlement mechanisms and hydrogen attack in particular, are pinpointed as crucial areas requiring study. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A022 054 8/7 8/9 10/1
INFORMATICS INC ROCKVILLE MD

Geothermal Energy.

(U)

NOV 75 530P Stevovich, Vlastimir A. ;
CONTRACT: MDA903-76-C-0099, DARPA Order-3097

UNCLASSIFIED REPORT

DESCRIPTORS: *Geothermy, Energy conversion,
Exploration, Electric power production,
Agriculture, Industrial plants, Industries,
Medicine, Planning, History, Reviews, El
Salvador, Iceland, Italy, Japan, Mexico, New
Zealand, Turkey, United States, USSR
IDENTIFIERS: *Geothermal energy conversion,
Technology assessment

(U)

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This is a comprehensive review of present major developments and future planning in various fields of applied geothermal engineering. The study covers theoretical and experimental data on the background and state-of-the-art of applied geothermal research in general, with emphasis on foreign work.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A021 655 13/2 10/1 21/4
NAVAL WEAPONS CENTER CHINA LAKE CALIF

Conversion of Solid Waste to Fuels. (U)

DESCRIPTIVE NOTE: Final rept. Jul 73-Jul 74,
JAN 76 332 Benham, C. B. ; Diebold, J. ;
REPT. NO. NWC-TP-5797
CONTRACT: ARPA Order-2772
MONITOR: GIDEP, GIDEP E053-0796, 337.25.20.00-X7-
01

UNCLASSIFIED REPORT

DESCRIPTORS: *Solid wastes, *Energy conversion,
*Waste disposal, Alcohols, Methyl radicals,
Gasoline, Pyrolysis, Military facilities, Cost
analysis, Selection, Synthesis (Chemistry),
Pilot plants, Processing, Fuels, Benzene
IDENTIFIERS: Methanol, Polymer gasoline, Octane,
*Synthetic fuels (U)

Economic and practical processes for recovering
energy from solid waste were studied. Two promising
fuels were identified - polymer gasoline and
methanol. A nominal 10-pound-per-hour pyrolysis
system was constructed and tested. Preliminary cost
analyses and studies of the effects of population and
energy market value on fuel costs were also
conducted. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A021 424 10/3 7/5
NAVAL WEAPONS CENTER CHINA LAKE CALIFEvaluation of Some Thionine Redox Systems
as Potential Regenerative Photogalvanic
Batteries. (U)

FEB 76 25P Fine, Dwight A. ; Fletcher,
Aaron N. ;
REPT. NO. NWC-TP-5813
PROJ: ZR011-07
MONITOR: GIDEP, GIDEP E053-0138, 102.60.00.00-X7-
02

UNCLASSIFIED REPORT

DESCRIPTORS: *Electrochemistry, *Photoelectricity,
*Dyes, *Solar cells, *Ethylenedinitrilo
tetraacetates, Performance tests, Sulfur
heterocyclic compounds, Nitrogen heterocyclic
compounds, Energy conversion, Oxidation reduction
reactions, Electrodes, Cobalt compounds,
Electrolytes, pH factor,
Concentration (Chemistry)
IDENTIFIERS: *Phenazathionium/diamino-sulfide,
*Photogalvanic cells (U)
(U)

This report summarizes preliminary investigations
on photoelectrical systems involving thionine dye and
inorganic reducing agents; these systems offer
potential for use as photogalvanic cells in solar
energy conversion. The report stresses the
thionine-cobalt(II)ethylene-diaminetetraacetate
(EDTA) system, which has yielded voltages and
currents comparable to and in some cases exceeding
those which have been reported for the thionine-
Fe(2+) system. Measurements on the thionine-
CoEDTA(2-) system have been carried out using
two types of transparent electrode, tin dioxide and
gold/palladium. Effects of concentration and aging
on voltages are reported here, as well as results of
closed-circuit measurements under load. (U)

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AD-A021 424

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A020 794

10/1

NOTTINGHAM (H D) AND ASSOCIATES INC MCLEAN VA

Review and Analysis of National Energy
Research and Development Programs and
Proposals.

(U)

DESCRIPTIVE NOTE: Final rept.,

JAN 76 433P Singh, T. ; Soni, J. S. ;

CONTRACT: DAAG53-75-C-0233

MONITOR: USAFESA-RT 2006

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated 7 Oct 74,
AD-A008 887.

DESCRIPTORS: *Energy, Nuclear energy, Solar
energy, Geothermy, Energy conversion, Energy
conservation, Energy storage, Shale, Transmission
lines, Impact, Reviews, Catalogs, Surveys,
Planning

(U)

IDENTIFIERS: *Research projects, Geothermal
energy, Shale oil, Photovoltaic conversion,
Solar space heating, Wind power, Solar sea power
plants, Biological energy conversion,
Environmental impacts

(U)

Tabulated and analyzed in this report are recently
completed and on-going energy R and D programs by
pertinent governmental and industrial organizations.
The five major areas of discussion in this study
include: nuclear fission; renewable energy
resources; conversion systems; energy conservation;
and multi-directional energy R and D studies.
Outlined are the state-of-the-art; established
national goals and objectives; nature of R and D
studies currently underway; and recommendations for
future R and D work by the U.S. Army.

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AD-A020 794

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AD-A018 858

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A018 858

7/4

11/7

UNIVERSITY COLL OF NORTH WALES BANGOR SCHOOL OF PHYSICAL
AND MOLECULAR SCIENCES

Preparation and Properties of a Stable
Metallic Ferromagnetic Colloid.

(U)

DESCRIPTIVE NOTE: Annual technical rept. Oct 74-Oct
75.

SEP 75 25P Windle, P. L. ; Popperwell,

J. ; Charles, S. W. ;

CONTRACT: DA-ERO-75-G-025

PROJ: DA-1-T-161102-B-32-D

TASK: 1-T-161102-B-32-D-00

UNCLASSIFIED REPORT

DESCRIPTORS: *Ferromagnetic materials, *Colloids,
Coatings, Particles, Tin, Iron, Mercury,
Fluid flow, Seals (Stoppers), Additives,
Sodium, Stability, Energy conversion, Great
Britain

(U)

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IDENTIFIERS: Ferromagnetic colloids

Results are presented in this report on the long
term stability of metallic ferromagnetic liquids
containing iron particles in mercury. The effect
of various coatings is considered. In particular a
tin coating is found to enhance the stability in the
long term. A different method to introduce
stability by controlling the contact potential
between particle and fluid by the addition of sodium
is described and shown to improve the stability to a
point where the long term growth is negligible (the
maximum radius being 40-45A). This is a very
important development and leads to the possible uses
of these fluids in devices such as magnetic seals and
energy conversion systems.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A015 954 10/2 8/10
NAVAL ACADEMY ANNAPOLIS MDOcean Thermal Energy Conversion: A
Model Approach.

(U)

DESCRIPTIVE NOTE: Research rept.,
MAY 75 87P Frey, Thomas W. ;
REPT. NO. USNA-TSPR-66

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on a Trident Scholar
Project.

DESCRIPTORS: *Electric power production, *Sea water,
Oceans, Tropical regions, Energy conversion,
Aluminum, Heat exchangers, Heat sinks, Rankine
cycle, Refrigerants, Turbogenerators, Pressure,
Cooling, Heating, Feasibility studies, Model
tests, Electric power plants

IDENTIFIERS: *Ocean thermal energy conversion,
OTEC (Ocean Thermal Energy Conversion), R-
11 refrigerant, Solar sea power plants

(U)

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An Ocean Thermal Energy conversion model was
successfully built and it has demonstrated the
feasibility of power generation from small
temperature differences similar to those existing in
the tropical oceans. Seventy watts of electrical
power were generated at a pressure different of .32
psi, corresponding to an 11 F internal temperature
differential. The model, the proceedings and
details are described in the work.

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AD-A015 954

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AD-A014 858

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A014 858 10/1
AIR FORCE WEAPONS LAB KIRTLAND AFB N MEXAlternative Energy Sources for United
States Air Force Installations.

(U)

DESCRIPTIVE NOTE: Final rept. Jul 74-Jun 75,
AUG 75 111P DeWitte, Michael D. ;
REPT. NO. AFWL-TR-75-193
PROJ: AF-2102
TASK: 21022E04

UNCLASSIFIED REPORT

DESCRIPTORS: *Air Force facilities, *Air Force
planning, Fuel consumption, Coal, Natural gas,
Fuel oil, Electricity, Forecasting, Substitutes,
Solar energy, Wind, Geothermy, Energy
conversion, Reviews

IDENTIFIERS: Fuel substitution, Energy
consumption, Electric power demand, Wind power,
Geothermal energy, *Energy policy

(U)

(U)

This report is concerned with the consumption and
cost of facilities-related energy, both present and
future, at Air Force installations, and it
presents a basic assessment of the potential of
alternative energy sources. In particular-solar,
wind, and geothermal energy resources are
investigated.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A014 067 10/2 7/4
AMERICAN UNIV WASHINGTON D C

Research on Electrochemical Energy Conversion Systems. (U)

DESCRIPTIVE NOTE: Interim progress rept. no. 6, Apr-Oct 74,

MAR 75 29P Adams, Alayne A.; Foley, Robert T.;

CONTRACT: DAAK02-72-C-0084

PROJ: DA-1-T-161102-A-34-A

TASK: 1-T-161102-A-34-A-03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Jul 74, AD-786 685.

DESCRIPTORS: *Fuel cells, *Electrolytes, Electrochemistry, Sulfonic acids, Phosphoric acids, Carbinols, Hydrogen, Oxidation, Propane, Performance (Engineering), Laboratory tests, Temperature, Reliability (Electronics)

IDENTIFIERS: Hydrocarbon air fuel cells, Propane air fuel cells, Fuel cell electrolytes, Methane sulfonic acid/trifluoro

(U)

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The research has involved work on two tasks: a search for electrolytes alternative to phosphoric acid for direct and indirect hydrocarbon-air fuel cells, and a study of the corrosion characteristics of electrolytes for intermediate-temperature hydrocarbon-air fuel cells. The effort during this reporting period has been concentrated on the further investigation of the electrochemical behavior of trifluoromethanesulfonic acid monohydrate as a fuel cell electrolyte. The studies dealt with the use of methanol as a fuel, both from electrooxidation at a platinum electrode and from its tendency to interfere with the air electrode. Methanol dissolved in CF3SO3H.H2O was electrooxidized over a temperature range of 23C to 135C with the highest rate in the neighborhood of 80C. At temperatures above 100C vaporization losses are excessive. Methanol interferes with the air electrode. The electrochemical activities of hydrogen, propane, and air were investigated at a platinum electrode in CF3SO3H.H2O at 23C.

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AD-A014 067

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AD-A013 561

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A013 561 10/1 5/3
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

Thermoeconomic Analysis of Vapor Power Systems. (U)

DESCRIPTIVE NOTE: Final rept. for 1975, JUN 75 106P Sheppard, F. L.; Hartman, J. K.;

J. K.; Kelleher, M. D.; Nunn, R. H.;

REPT. NO. NPS-59Nn75062A

UNCLASSIFIED REPORT

DESCRIPTORS: *Thermodynamic cycles, *Economics, *Energy conversion, Heat exchangers, Ammonia, Sea water, Heat transfer, Cost analysis, Mathematical models, Algorithms, Optimization

IDENTIFIERS: *Heat recovery, Economic analysis, Solar sea power plants

(U)

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A method is presented for determining the relationships between the costs and technical performance of vapor power systems in a manner which permits fundamental design specifications to be made optimally with respect to overall system lifetime costs. Means of applying optimization techniques for large scale systems to the thermoeconomic analysis of vapor power systems are described and demonstrated with a simplified sample model. The example studied is an environmentally driven ocean thermal gradient system. A sequential unconstrained minimization algorithm is employed for overall system design optimization.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A012 500 10/1

NAVAL ACADEMY ANNAPOLIS MD ENVIRONMENTAL PROTECTION
RESEARCH AND DEVELOPMENT TEAMSuitability of Guam from an Environmental
Aspect as a Potential Site for Ocean
Thermal Energy Conversion Plants.

(U)

DESCRIPTIVE NOTE: Final rept. 1 Jul 74-1 Jan 75,
APR 75 20P Corey,Roland Reece , Jr;
REPT. NO. USNA-EPRD-11

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *Thermal power
plants, Pacific Ocean islands, Site selection,
Sea water, Vertical orientation, Surface waters,
Mixtures, Environmental protection, Ocean
currents, Upwelling, Tropical regions, Pacific
Ocean, Discharge, Feasibility studies, Cold
flow

(U)

The bottom drops off rapidly around Guam and depths suitable for ocean thermal energy systems are obtained reasonably close to shore, which increases the possibility that cold water discharge would have an environmental effect. Discharge of cold water into the open sea could have two results: Cool water could drift away at or near the surface, simulating natural upwelling with the same beneficial effects; or it could plunge to an intermediate depth with minimal environmental effects. Discharge of cool water, on the other hand, into near-shore environments would probably kill or injure many benthic forms and coral reefs. Prevailing currents in this area are from east to west; therefore, siting on the west side of the island would appear to be preferable. First, cold water would be carried out to sea rather than into shallow water near shore. Secondly, greater depths are available closer to shore on the western as opposed to the eastern side of the island. Most of the places which have been identified as potential fishing grounds are on the north or south of the island, so situated that discharges from eastern but not western plant sites could affect them. (Author)

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AD-A012 500

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AD-A011 956

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A011 956 20/10 7/4 7/3

NORTH CAROLINA UNIV CHAPEL HILL DEPT OF CHEMISTRY

Photochemistry of Transition Metal Complexes.
The Mechanism and Efficiency of Energy
Conversion by Electron-Transfer Quenching.

(U)

DEC 74 5P Bock,C. R. ;Meyer,T. J.
;Whitten,D. C. ;
CONTRACT: DAHC04-74-G-0025, NSF-GP-42846X
MONITOR: ARO 8168.13-C

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of the American
Chemical Society, v97 n10 p2909-2911, 14 May 75.DESCRIPTORS: *Complex compounds, *Ruthenium
compounds, *Pyridines, *Quenching(Inhibition),
*Photochemical reactions, *Electron transfer,
Excitation, Energy conversion, Metalorganic
compounds, Transition metals, Reprints

(U)

A study of electron transfer quenching of Ru(bipy)3(2+) by a series of compounds having variable reduction potentials is reported. These results present a detailed picture of the excited state electron transfer process and indicate that energy conversion is an extremely efficient process for Ru(bipy)3(2+).

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD-A011 084 22/2 10/2
ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH (ENGLAND)

Work in UK on the Applications of Solar Cells in Space.

(U)

DEC 74 16P Treble, F. C. ;
REPT. NO. RAE-TR-74159
MONITOR: DRIC BR-44998

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Photovoltaic effect, Scientific satellites, Spacecraft components, Silicon, Cadmium sulfides, Reviews, Great Britain
IDENTIFIERS: Ariel 3 satellite

(U)

(U)

British efforts and achievements in the field of photovoltaic solar energy conversion in space over the past 14 years are reviewed. The satellites powered by British solar cells are listed and the Ariel 3 array is described in detail by way of an introduction to the subject. Silicon cells of conventional thickness have been developed to a conversion efficiency exceeding 11.5% and thin cells with a superior power-to-weight ratio have been developed and manufactured in pilot production. Other achievements are a cheaper and better type of glass coverslip, an ultra-thin integral glass coating and lightweight flexible cadmium sulfide cells. In anticipation of future multikilowatt power requirements, a prototype lightweight deployable array embodying advanced concepts has been built and qualified for prolonged operation in the geostationary orbit.

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AD-A011 084

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AD-A010 103

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD-A010 103 19/1 10/2
BATTELLE COLUMBUS LABS OHIO

Development of Thermocouple Generators for Small-Caliber Munitions Fuze. Phase I.

(U)

DESCRIPTIVE NOTE: Final rept. 1 Feb-3 Sep 74,
MAR 75 80P Eggers, Philip E. ;
CONTRACT: F33615-74-C-4043
MONITOR: ARL TR-75-0013

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also rept. no. AFATL-TR-73-58, AD-911 300.

DESCRIPTORS: *Thermoelectric power generation, *Proximity fuzes, Thermocouples, Thin films, Small arms ammunition, Sputtering, Thermal analysis, Bismuth compounds, Tellurides
IDENTIFIERS: Bismuth tellurides

(U)

(U)

An analytical study has been performed to assess the feasibility of using aerodynamically heated thermoelectric converters to power RF proximity fuzes. The collective results of this study indicate that such a thermoelectric power supply is feasible for use with 20 mm projectiles and is compatible with the existing RF fuze circuit and safe arming distance requirements. A disc module concept has evolved from this study involving thin-film bismuth telluride as the basic thermoelectric element. Preliminary experimental studies were completed in order to identify principal parameters for the bismuth telluride.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A008 887 5/2

NOTTINGHAM (H D) AND ASSOCIATES INC MCLEAN VA

Technical Review and Analysis of National
Energy Research and Development Programs and
Proposals (Phase II).

(U)

DESCRIPTIVE NOTE: Final rept. 4 Apr-7 Oct 74,
OCT 74 280P Singh, Tara ; Marks, Alfred
H. ;

CONTRACT: DAAK02-74-C-0214

PROJ: DA-4-A-762719-A-886

TASK: 4-A-762719-A-88606

UNCLASSIFIED REPORT

Availability: Reference only at NTIS. No copies
furnished by DDC.

DESCRIPTORS: *Energy, Nuclear energy, Solar
energy, Energy conversion, Energy conservation,
Energy storage, Shale, Tidal currents,
Transmission lines, Impact, Reviews, Catalogs,
Surveys

(U)

IDENTIFIERS: *Research projects, Geothermal
energy, Shale oil, Tidal power, Environmental
impacts, Energy transmission

(U)

The scope of this investigation included a survey
of the energy research and development programs being
pursued in the United States. Included is a
review and analysis of the recently completed
projects as well as current and future energy R and
D programs. Principal objectives were: to
identify projects or programs having a potential
application to the fixed facilities of the Army; to
assess the state-of-art of the technology; and to
determine the impact of such R and D programs on
the Army's facilities.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A008 813 3/2

POLYTECHNIC INST OF NEW YORK BROOKLYN MICROWAVE RESEARCH
INST

Progress Report No. 39, 15 Sep 73-14 Sep
74, to the Joint Services Technical Advisory
Committee. A Summary of Current Research
at The Microwave Research Institute.

(U)

DESCRIPTIVE NOTE: Scientific interim rept.,

NOV 74 416P Oliner, Arthur A. ;

REPT. NO. POLY-MRI-452.39-74

CONTRACT: F44620-69-C-0047, F44620-74-C-0056

PROJ: AF-4751

MONITOR: AFOSR TR-74-1922

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Nov 73, AD-
774 747.

DESCRIPTORS: *Microwaves, *Scientific research,
Wave propagation, Waveguides, Microwave equipment,
Quantum electronics, Laser beams,
Plasmas(Physics), Energy conversion, Solid
state physics, Communication and radio systems,
Computer applications, Control theory

(U)

;Contents: Electromagnetics and waveguide
techniques; Quantum electronics and optics;
Plasma physics and energy conversion; Solid state
and materials; Communications and computers;
Systems, control, and network theory.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD-A008 182 10/2
MASSACHUSETTS INST OF TECH CAMBRIDGE SPACE PROPULSION
LAB

Research on Charged Alkali Colloids for
Aerospace Vehicle and Ground Based Power
Generation.

(U)

DESCRIPTIVE NOTE: Final rept. 10 Feb 72-7 Feb 74,
JAN 75 121P Solbes,Albert ;Martinez,

Manuel ;
CONTRACT: F33615-72-C-1258
PROJ: AF-7116
TASK: 711601
MONITOR: ARL 75-0004

UNCLASSIFIED REPORT

DESCRIPTORS: *Electrohydrodynamics, Energy
conversion, Liquid metals, Gas discharges,
Nucleation, Electron density, Ion density
IDENTIFIERS: Dielectric breakdown,
Electrohydrodynamic generators

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Results of the study of the fundamental physical
processes and measurement of properties aimed at
predicting the performance of two fluid liquid metal
vapor EFD converters are presented. The
condensation studies indicate that substantial alkali
boiler concentrations (30% cesium) are required
to produce appreciable homogeneous nucleation in
alkali amalgam vapors. The case of heterogeneous
condensation about ions is also studied. The
results of breakdown studies for amalgam vapor
mixtures with helium, nitrogen, and hydrogen show the
latest gas to be the most desirable choice for
efficient conversion. Generator studies indicate
the existence of contact charging of liquid mercury
droplets with surfaces of higher work function.
The behavior of the generator is seen to depend
strongly on the amount of recirculated condensate and
current. An analysis is presented for the
efficiency of neutralization of charges at the
collector.

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AD-A007 799

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD-A007 799 10/1 21/4
EDGEWOOD ARSENAL ABERDEEN PROVING GROUND MD

Proceedings of Annual Symposium 'Energy
Research and Development' (5th) on 13-14
March 1974, Sponsored by the American Defense
Preparedness Association,

(U)

JAN 75 177P Falconer,Donald ;Gerber,
Bernard ;Magr3,William ;
REPT. NO. EO-SP-74026

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy, *Meetings, Petroleum
products, Coal, Thermonuclear energy, Hydrogen,
Wind, Photosynthesis, Enzyme chemistry, Wastes,
Cellulose, Hydrolysis, Solar energy
IDENTIFIERS: Coal gasification, Coal liquefaction,
Wind power generation

(U)

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;Contents: Energy research and development
programs of the United States Department of the
Interior; Energy R and D programs of the
U.S. Atomic Energy Commission; National
Science Foundation energy research and
development programs; The energy problem and
defense; American Petroleum Institute; Coal
research and development; Thermonuclear fusion
energy; pictorial overview of the hydrogen-energy
concept; Review of power from the wind;
Bioconversion of solar energy-photosynthesis;
Enzymatic hydrolysis of cellulosic wastes; Coal
liquefaction and gasification; Beneficial uses of
waste heat from steam electric power plants; Energy
systems analysis.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A007 415 10/2 20/9

NAVAL INTELLIGENCE SUPPORT CENTER WASHINGTON D C
TRANSLATION DIVThermodynamics of Liquid Metal MHD
Converters.

FEB 75 182P Kalafati, D. D. ; Kozlov, V.

B. ;

REPT. NO. NISC-Trans-3622

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Draft edited trans. of mono.
Termodinamika Zhidkometallicheskih MGD
Preobrazovatelei, Moscow, 1972.DESCRIPTORS: *Magnetohydrodynamic generators,
*Thermodynamics. Liquid metals, Electric power
production, Translations, USSR
IDENTIFIERS: *Liquid metal MHD generators(U)
(U)

:Contents: Thermophysical principles of liquid metal MHD converters; Thermodynamic cycles and heat systems of MHD converters with a liquid metal working substance; Basic principles for the thermodynamic analysis of cycles of liquid metal MHD converters; Thermodynamics of cycles with condensation of the vapor phase by mixing before the MHD generator; Thermodynamics of cycles with separation of vapor phase before the MHD generator; Thermodynamics of binary cycles for stationary power plants using liquid metal MHD converters.

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A005 971 10/1

ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
VA

An Investigation of the Influence of the Wet Surface Area of a Positive Electrode on the Energy Conversion Efficiency During the Electrical Explosion of Conductors,

(U)

JUN 74 10P Rakhuba, V. K. ; Korotkov, V.
A. ; Nesvetailov, G. A. ; Stokovich, N. N. ;
REPT. NO. FSTC-HT-23-0426-74

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Akademiya Nauk BSSR,
Minsk. Vestsi. Seriya Fizika-Energetichnykh
Nauk, n1 p60-64 1972.DESCRIPTORS: *Electromechanical converters, Energy
conversion, Exploding wires, Shock waves,
Translations, USSR

(U)

Some experimental results of energy release upon the electrical explosion of conductors are presented. It is shown that an anode surface area, unlike the case of free discharge, has no great influence on the deformed membrane characteristics checked. Some recommendations for electrode systems geometry using exploding conductors are given.

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AD-A005 971

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A005 918 10/2 20/12
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Long Wave Sensitivity of Solar Converters
n-CdS-Cu(2-x)S.

(U)

NOV 74 8P Marchenko, A. I. ;Pavelets,
S. Yu. ;Fedorus, G. A. ;
REPT. NO. FSTC-HT-23-1574-71

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Ukrainskii Fizicheskii
Zhurnal (USSR) v15 n9 p1530-1534 1970.

DESCRIPTORS: *Solar cells, *Cadmium sulfides,
*Photovoltaic effect, Copper compounds, Sulfides,
Impurities, Semiconductor junctions, Infrared
spectra, Near infrared radiation, Translations,
USSR

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IDENTIFIERS: *Copper sulfides, Photovoltaic
conversion, Heterojunctions

(U)

Long Wave Sensitivity of Solar Converters n-
CdS-Cu(2-x)S--Translation.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A005 549 5/3
ARMY WAR COLL CARLISLE BARRACKS PA

Technological Feasibility of Alternative
Energy Sources.

(U)

DESCRIPTIVE NOTE: Student essay,
OCT 74 31P Zweigle, Maurice L. ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy management, Resources
IDENTIFIERS: *Energy alternatives, *Energy
sources, Coal gasification, Coal liquefaction,
Geothermal energy, Oil shale

(U)

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The US energy shortage is discussed. The
technology of coal gasification or liquefaction,
shale oil from oil shale, and geothermal energy
recovery is presented in sufficient detail to show
feasibility of these as energy source alternatives to
petroleum crude. Technical trade publications data
show that essentially all necessary process
technology is known, although important improvements
are possible, and have been proved at pilot plant
scale. Conversion of coal to energy offers the
best opportunity for rapid development as a broad,
in-house US energy source. The other two should
be developed as time and funds are available.

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AD-A005 549

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A005 079 10/3
ENERGY RESEARCH CORP BETHEL CONNLow Power Metal Hydride Fuel Cell/
Battery Hybrid Systems.

(U)

DESCRIPTIVE NOTE: Final rept. 15 Jun 73-15 Oct 74,
JAN 75 49P Baker, Bernard S. ;Camp,

Ralph N. ;

CONTRACT: DAAB07-73-C-0227

PROJ: DA-1-G-763702-DG-10

TASK: 1-G-763702-DG-1001

MONITOR: ECOM 0227-F

UNCLASSIFIED REPORT

DESCRIPTORS: *Fuel cells, *Detectors, Calcium hydrides, Hydrogen peroxide, Reliability(Electronics), Fabrication, Life tests, Auxiliary, Converters, Nickel cadmium batteries

IDENTIFIERS: Calcium hydride fuel cell, Design

(U)

(U)

The use of solid hydrides, solid super-oxides and hydrogen peroxide are examined as possible reactant sources for small fuel cell systems. Life testing of small calcium hydride-hydrogen peroxide powered alkaline matrix fuel cell is described. A complete six volt fuel cell subsystem was constructed using calcium hydride as fuel and hydrogen peroxide as oxidant. Water vapor produced by the fuel cell is used to react with the hydride to produce further hydrogen fuel. A Kipp Generator supplies oxygen from the catalytic decomposition of the hydrogen peroxide. The six volt output from the fuel cell is fed into a DC-DC converter where its output is boosted to 32V. The 32V is floated across 23 - 50mA hour nickel-cadmium batteries. The total system can deliver a steady 2mA at 32V or 430 mA-60ms pulses at 26V.

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AD-A005 079

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AD-A004 814

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A004 814 10/2
MASSACHUSETTS INST OF TECH CAMBRIDGECycle Study of a Mercury - Colloidal
Electrofluid Dynamic Power Generator.

(U)

DESCRIPTIVE NOTE: Interim rept. 18 Apr 72-17 Jul 72,
OCT 74 70P Urquidí F. Beatriz ;

CONTRACT: F33615-72-C-1258, F33615-69-C-1114

PROJ: AF-7116

TASK: 711601

MONITOR: ARL 74-0127

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Master's thesis.

DESCRIPTORS: *Electrohydrodynamics, Mercury, Hydrogen, Vapors, Mixtures, Colloids, Power supplies, Computer programs, Theses

IDENTIFIERS: *Electrohydrodynamic generators, Direct energy conversion

(U)

(U)

The author presents a study of an Electro-Fluid-Dynamic power system using mercury as the working vapor and hydrogen as the fill gas. Viscous coupling between mercury vapor and hydrogen is assumed. A detailed study of the various components, and related efficiencies, of the system is made and expressions for their dependence on various system parameters are derived. The overall system efficiency is optimized and analytical expressions for the optimum values of the operating parameters are given. A sensitivity analysis is made to determine the effect, on the efficiency of changes in several system parameters. Numerical calculations are carried out using a simple computer program. The results of the calculations are shown in graphical and tabular form. As an illustration, a 12.5 KW output power generator is considered and the main design characteristics are presented.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A004 813 10/2
 MASSACHUSETTS INST OF TECH CAMBRIDGE
 Study of a Charged Condensing Cesium
 Amalgam Vapor Jet.

(U)

DESCRIPTIVE NOTE: Interim rept. Apr 72-Jul 72,
 NOV 74 200P Milora, Stanley L.;
 CONTRACT: F33615-72-C-1258
 PROJ: AF-7116
 TASK: 711601
 MONITOR: ARL 74-0129

UNCLASSIFIED REPORT

DESCRIPTORS: *Electrohydrodynamics, *Gas flow,
 *Cesium, Jet mixing flow, Colloids, Space
 charge, Gas ionization, Light scattering, These
 IDENTIFIERS: *Electrohydrodynamic generators,
 Direct energy conversion

(U)

(U)

A study of the production and charging of a cesium-
 amalgam colloid was undertaken in order to ascertain
 the feasibility of its use in a high temperature two
 fluid electro-fluid dynamic power system. Light
 scattering techniques were applied to the study of
 the condensation process in a cesium-amalgam vapor
 jet upon mixing with a cold nitrogen background gas. (U)

AD-A004 813

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AD-A004 812

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A004 812 10/2
 MASSACHUSETTS INST OF TECH CAMBRIDGE DIV OF SPONSORED
 RESEARCH

Research on Charged Alkali Colloids for
 Aerospace Vehicle and Ground Based Power
 Generators.

(U)

DESCRIPTIVE NOTE: Final rept. 23 Sep 68-23 Sep 71,
 OCT 74 161P Solbes, Albert;
 CONTRACT: F33615-69-C-1114
 PROJ: AF-7116
 TASK: 711601
 MONITOR: ARL 74-0125

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-721 197.

DESCRIPTORS: *Electrohydrodynamics, *Gas flow,
 Alkali metals, Colloids, Charge carriers, Power
 supplies, Spacecraft, Electron emission, Ion
 sources, Numerical analysis, Nucleation
 IDENTIFIERS: *Electrohydrodynamic generators,
 Direct energy conversion

(U)

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A thermodynamic study of two fluid EFD ejector
 generator systems is presented. A figure of merit
 is defined which allows comparison of various fluid
 combinations. An overall cycle optimization leads,
 for a mercury hydrogen system to efficiencies of the
 order of fifteen percent. Subsequently, various
 aspects of conversion process and its limitations are
 considered including: effect of space charge cloud
 divergence on generator performance, limitations due
 to colloid drop size and number density, effect of
 electron and ion emission from drops, breakdown
 strength.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A002 655 10/2

ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE VA

Results of Work on Thermoemission Conversion, (U)

MAY 74 5P Karetnikov, D. ;
REPT. NO. FSTC-HT-23-147-74

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of paper presented at an International Meeting on Thermionics, Vienna, 1972.

DESCRIPTORS: *Thermionic power generation, Electric generator, Radioactive isotopes, Translations, USSR (U)

The paper reports that tests of the TOPAZ-3 thermionic reactor, similar in design to its 2 predecessors, began in 1972. By 1 March 1973, it had operated about 3000 hours at 5-7 kV, and efficiency was 30% higher than that of the first reactors. At the same time, tests of 1- and 5-element generating channels were conducted, with a 5-element channel operating for over 3000 hours at 1.7 W/sq cm. A single element with tungsten-rhenium emitter and niobium collector operated 2670 hours with initial power density of 7 W/sq cm dropping to nearly 3.5 W/sq cm by the end of the test. Unexpectedly great reduction in neutral component concentration was found in theoretical-experimental study of nonstationary cesium plasma. A triode thermionic converter, as a high-temperature thyratron, using a cesium-barium mixture at low pressure can close the circuit at up to 100 V, cathode temperature 1600C, current density up to 20 A/sq cm and voltage drop of not over 5 V. (U)

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AD-A002 639

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A002 639 10/2

ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE VA

Thermionic Conversion. (U)

FEB 74 6P
REPT. NO. FSTC-HT-23-1822-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. from Komsomolskaya Pravda (USSR) n213 1972.

DESCRIPTORS: *Radioisotope thermoelectric devices, *Thermionic power generation, Thermionic converters, Translations, USSR (U)

The role of thermionic reactors is discussed. 'Topaz' type prototypes have been tested in the Soviet Union with quite satisfactory results. It is hoped that, in the next few years, they will be used in spacecraft and save millions of dollars in the space program. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A002 212 21/4
RAND CORP SANTA MONICA CALIFFuel from Organic Matter: Possibilities
for the State of California.OCT 73 20P Dugas,Doris J. ;
REPT. NO. 9-5107

(U)

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *California, *Fuels, Methane, Organic materials, Forests, Farm crops, Wastes(Industrial), Solid wastes, Urban areas, Quantities, Cost estimates, Industries, Food processing, Lumber, Sewage

IDENTIFIERS: Agricultural wastes, Waste disposal, *Solid waste disposal, Refuse

(U)

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This study investigates the amounts of organic material that might be made available for energy purposes in the State of California, its potential fuel value, and the estimated cost. Sources of organic material that are considered are: (1) crops grown specifically for energy, (2) natural forests, and (3) wastes from the urban, agricultural, and industrial sectors.

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A002 204 21/4
RAND CORP SANTA MONICA CALIF

Fuel from Organic Matter,

OCT 73 26P Dugas,Doris J. ;
REPT. NO. P-5100

(U)

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *Fuels, Organic materials, Photosynthesis, Vegetation, Farm crops, Forests, Trees, Algae, Corn, Sorghum, Wastes(Industrial), Solid wastes, Urban areas, Anaerobic processes, Yeasts, Fermentation, Pyrolysis, Quantities

IDENTIFIERS: Agricultural wastes, Waste disposal, *Solid waste disposal, Refuse, Cost estimates, Geographic locations

(U)

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It has been suggested frequently that the solar energy stored in green plants and organic wastes could be tapped to provide an alternative to the dwindling resources of fossil fuels. The advantage would be a fuel source that is renewable and available in our own time. This paper investigates the amounts of energy that might be made available from organic sources, the approximate cost of producing it and converting it to a convenient fuel, and some of the implications of a large-scale agro-energy industry.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A002 042 10/2

MINNESOTA MINING AND MFG CO ST PAUL

Manportable Thermoelectric Generator. (U)

DESCRIPTIVE NOTE: Final rept. Apr 73-Aug 74,
 NOV 74 42P Magnuson,K.;Pitcher,E.;

Stroom,P.;

CONTRACT: DAAB07-73-C-0138

PROJ: DA-1-S-762705-AH-94

MONITOR: ECOM 73-0138-F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: *Thermoelectric power generation,

Manportable equipment

IDENTIFIERS: *Thermoelectric generators,

Design

(U)

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The report describes the design, fabrication, and test of the 120 Watt Manportable Thermoelectric Generator (exploratory development model). This portable device is comprised of five functional subsystems: thermoelectric converter, liquid fuel burner, electronics circuitry, fuel system, and cooling system. Two experimental generators were built and evaluated. The test results show that the system operates on all liquid fuels, ranging from gasoline to diesel oil (DF-1) and that it has potential as a portable, 120-Watt, generator for Army field use.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A001 525 10/2

ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

Cylindrical Erbium Oxide Radiator
 Structures for Thermophotovoltaic
 Generators. (U)

DESCRIPTIVE NOTE: Research and development technical
 rept., AUG 74 33P Guazzoni,Guido E.;Kittl,

Emil;

REPT. NO. ECOM-4249

PROJ: DA-1-S-762705-AH-94

UNCLASSIFIED REPORT

DESCRIPTORS: *Thermoelectric power generation,

*Photovoltaic effect, Photoelectric

cells(Semiconductor), Erbium compounds, Silicon

carbides, Germanium, Infrared photoelectric cells,

Infrared radiation, Slip casting, Thermal shock,

Cylindrical bodies, Coatings, Test methods

IDENTIFIERS: Erbium oxides, *Thermophotovoltaic

converters

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Results of an experimental investigation are reported which cover the fabrication and evaluation of slip-casted and hot pressed erbium oxide cylinders and silicon carbide structures coated with erbium oxide. Suitable erbium oxide cylindrical structures will be used as radiating mantles in thermophotovoltaic converter systems. The pure erbium oxide cylindrical mantles were found to be deficient in thermal shock resistance which resulted in cracking of the mantles and extremely low thermal cycle life. The erbium oxide coated silicon carbide structures provided satisfactory thermal cycling capability up to 1500C but their spectral emission showed a large content of background radiation which manifested itself in an increased amount of undesirable interband emission. Higher optical density of the erbium oxide coating, to provide reduction of unwanted background radiation, is necessary to make these structures of practical use.

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AD-A001 525

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
 AD-A001 489 20/9 10/2
 ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
 VA

Theoretical Possibility of Converting the
 Kinetic Energy of Ionized Gas Flow into
 Electricity.

JUL 74 9P Vorobev, O. S.; Eliseev, V.
 D.; Emilov, A. N.; Zakharenko, V. D.;
 Orfanov, I. V.;
 REPT. NO. FSTC-HT-23-483-74

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Akademiya Nauk SSSR.
 Izvestiya. Energetika i Transport, n6 p96-100
 1972.

DESCRIPTORS: *Plasmas(Physics), *Electric power,
 Kinetic energy, Gas flow, Energy conversion,
 Translations. USSR

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
 AD-A000 658 10/2
 ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

Proposed Standard Family of AC to DC Power
 Supplies.

(U)

DESCRIPTIVE NOTE: Technical rept.,
 SEP 74 19P Dudley, William L.;
 REPT. NO. ECOM-4258
 PROJ: DA-1-S-762705-AH-94
 TASK: 1-S-762705-AH-94-P-4293

UNCLASSIFIED REPORT

DESCRIPTORS: *Power supplies, *Converters, Army
 equipment, Standardization, Electronic equipment,
 Communication equipment, Voltage regulation,
 Military requirements, Silicon controlled
 rectifiers

IDENTIFIERS: AC to DC converters

(U)
(U)

The report presents a Standard Family of AC
 to DC Power Supplies established to provide
 militarized units that are compatible with size and
 weight improvements in field type solid state
 communications-electronics user equipments and which
 supply clean, quality power demanded for safe
 operation of semiconductorized equipment.
 Availability of this standard family will prevent
 proliferation and reduce the number of types of power
 supplies in the Army supply system. Detailed
 technical descriptions of six power supply models
 comprising the standard family are given. A program
 for development of new power processing technology
 for improved power supply design to keep pace with
 advancements in user equipment design is described.
 (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A000 211 10/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Thermodynamic Analysis and Parameter
Optimization of a Solar Thermoelectric Power
Unit with Radiation Heat Dissipation, (U)

MAR 74 16P Drabkin, L. M. ;
REPT. NO. FSTC-HT-23-1592-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Geliotekhnika (USSR) n3
p15-23 1972.

DESCRIPTORS: *Thermoelectric power generation,
*Thermodynamics, Heat transfer, Numerical
analysis, Solar energy, Translations, USSR
IDENTIFIERS: *Solar energy converters (U)
(U)

The methodology for optimizing the calculation of
parameters of a thermoelectric battery obtaining heat
at a constant junction temperature and emitting it
into the surrounding space by means of radiation at a
uniform temperature is examined. An equation for
the efficiency factor for the maximum power routine
is derived from a formula of A.F. Ioffe. The
methodology is applied to an example, and 27
parameters are calculated. (U)

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AD-A000 087

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A000 087 10/2 20/9
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

The MHD Generator - A Step toward the Energy
Supply of Tomorrow, (U)

AUG 74 11P Hanseiman, Bernd ;
REPT. NO. FSTC-HT-23-2518-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Significant
Accomplishments I. P. P. - M. A. N. 1971, by
R. Lagerwerff.

DESCRIPTORS: *Magnetohydrodynamic generators,
*Electric power production, Energy conversion,
Translations, West Germany (U)

The increasing demand for electrical energy
emphasizes more and more the problem of an economical
energy supply. One possibility to solve this
problem is the so-called MHD generator which
converts hot working gases directly into electrical
energy. Cooperation between M. A. N. (West
German Concern) and the Institute for
Plasma Physics (IPP) in Garching, West
Germany, has resulted in an MHD generator
beginning to be developed, which in its first
development phase will have a capacity of 10MW and
a length of operation of 10 seconds. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD-A000 077 21/2 21/4 19/1
NAVAL AIR SYSTEMS COMMAND WASHINGTON D C
Energy Conversion. I. Non-Propulsive Aspects.

DESCRIPTIVE NOTE: Research Program review.
MAR 74 166P

UNCLASSIFIED REPORT

DESCRIPTORS: *Flames, *Combustion, *Fuels, Fire suppression, Jet engine fuels, Soaps, Gels, Pyrotechnics, Aluminum compounds, Flares, Infrared radiation, Emission, Plumes, Binders, Smoke, Oxidation, Alkali metals, Temperature, Emission spectra

The papers included here were presented at the review of Energy Conversion (non-propulsive aspects) programs which was held 26-27 March 1974 at the University of Denver, Phipps Memorial Conference Center. Sessions were devoted to Fuels and to Pyrotechnics. Papers are entitled: Aluminum soap - hydrocarbon gel structures; Mechanisms of flame inhibition by chemical agents; High-density and low-viscosity missile fuels; Infrared spectral distribution of high temperature sources; Pyrotechnic flare spectroscopy; Alkali metal flame emitters; A mathematical model of flare plume combustion and radiation; Research on endothermic binders; precursor smoke formulations; Chemiluminescence for the determination of the kinetics and mechanism of jet fuel oxidative degradation.

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 920 469 9/5 9/3 9/1 20/3
10/2 10/3 7/4
BRADDOCK DUNN AND MCDONALD INC ALBUQUERQUE N MEX

Chemical Reaction Hertzian Generator.

DESCRIPTIVE NOTE: Final rept. 31 May-31 Dec 73.
MAY 74 139P
REPT. NO. BDM/A-1-74-TR
CONTRACT: F30602-73-C-0318
PROJ: AF-5573
TASK: 557306
MONITOR: RADC TR-74-111

UNCLASSIFIED REPORT

DESCRIPTORS: (*Pulse generators, *Microwave equipment), (*Magnetic fields, Compression), (*Energy conversion, Pulses), (*Power supplies, High explosives), (*Ferroelectric materials, Energy storage), (*Microwave oscillators, Reaction kinetics), Frequency shift, Mirrors, Doppler effect, Bellows, Helixes, Electric coils, Cavity resonators, Motion, Plasma oscillations, Expansion, Chemical reactions, Switching circuits, Slots, Voltage, Scattering, Raman spectra, Capacitors, Electric discharges, Barium titanates, Synchrotrons
IDENTIFIERS: *Flux compression, Frozen E field devices, Frozen B field devices, Brillouin scattering, *Hertzian generators, Chemical generators

This effort represents a first attempt at combining the two separate technologies of explosive flux compression and Hertzian generation for the purpose of obtaining ultra-high energy pulses at microwave frequencies. A number of interesting concepts were analyzed and three were selected by the contractor as most deserving of future attention. It is hoped that this report will stimulate further imaginative and creative thought in this direction leading eventually to a successful technique for accomplishing the aforementioned goal.
(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 914 187 20/13 11/6
 AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD
 MASS

Thermophysical Properties of Thermal Energy
 Storage Materials - Aluminum.

(U)

DESCRIPTIVE NOTE: Physical sciences research papers,
 JUL 73 33P Leiby, Clare C., Jr.; Ryan,

Thomas G.;
 REPT. NO. AFRL-PSRP-554, AFRL-TR-73-0421
 PROJ: AF-8659
 TASK: 865902

UNCLASSIFIED REPORT

DESCRIPTORS: (*REFRIGERATION SYSTEMS, CRYOGENICS),
 (*ALUMINUM, *ENERGY CONVERSION), (*NICKEL ALLOYS,
 COMPATIBILITY), (*CONTAINERS, NICKEL ALLOYS), THERMAL
 EXPANSION, HEAT TRANSFER, LIQUID METALS, FREEZING, PHASE
 STUDIES, SOLIDS, HEATING, SOLAR RADIATION, COOLING,
 MELTING, SPACECRAFT COMPONENTS, HEAT OF FUSION, INFRARED
 DETECTORS, THERMODYNAMICS, IRON ALLOYS, VACUUM
 APPARATUS, RUPTURE, CAPILLARY TUBES, LABORATORY
 FURNACES

(U)

IDENTIFIERS: *NICKEL ALLOY INCONEL X750, VUILLEUMIER
 REFRIGERATORS, HEAT PIPES

(U)

In response to RN-AFAPL-08-72-8, a program was initiated to determine the compatibility of Inconel canisters with specific thermal energy storage materials. A uniform temperature vacuum oven and a 100-min (65 min on and 35 min off) oven control were designed and constructed. The timer-oven system generates the thermal cycle of an energy storage canister in near-earth orbit. An X-750 alloy canister was fabricated, precipitation-hardened, loaded with 215 gm of pure aluminum, and sealed off under high vacuum. It was then fitted with six thermocouples and placed in the oven for a 5000-hr test. Initial temperature measurements indicated that the aluminum alternately melted and froze during each temperature cycle. After 48 hr, only partial melting occurred. After 9 days of continuous cycling, all melting had ceased and the test was terminated. It was found that the canister had ruptured and that its contents were extremely hard.

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AD- 912 744

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 912 744 10/2 18/13 20/9
 WESTINGHOUSE ELECTRIC CORP PITTSBURGH PA ASTRONUCLEAR
 LAB

Reactor and MHD System Study.

(U)

DESCRIPTIVE NOTE: Final rept.,
 FEB 73 95P Jones, A. R.; Black, D. L.
 ; Bifano, N. J.; Eichinger, R. L.; Hanson, J.
 P.;

REPT. NO. WANL-PR-N00014-2
 CONTRACT: N00014-72-C-0473
 PROJ: RF018-02, NR-274-161
 TASK: RF018-02-06

UNCLASSIFIED REPORT

DESCRIPTORS: (*NUCLEAR REACTORS, *MAGNETOHYDRODYNAMICS),
 (*MAGNETOHYDRODYNAMIC GENERATORS, *ELECTRIC POWER
 PRODUCTION), GAS COOLED REACTORS, NUCLEAR REACTIONS,
 LIQUID METAL COOLED REACTORS, FISSION, PLANNING,
 LITHIUM, HELIUM, ENERGY CONVERSION, HEAT EXCHANGERS,
 COMPRESSORS, NEUTRONS, COILS, SUPERCONDUCTORS,
 THERMONUCLEAR REACTIONS, ARGON, SODIUM, DOSE RATE,
 MIXTURES, TEMPERATURE, SHIELDING, WEIGHT

(U)

This report presents the results of the Reactor and MHD Systems Study. A preliminary review of advanced nuclear reactor technologies was performed; the gas-cooled (solid core) reactor and the liquid metal cooled reactor appear to have the greatest potential for application during the 1980-1990 time period specified for this study. Preliminary weight and size estimates on the basis of projected technologies for application with a reference liquid metal magnetohydrodynamic (MHD) energy conversion system indicated a directly coupled gas cooled reactor (including shield and containment vessel) would weigh 833,000 pounds (416 tons) and have a maximum diameter of 17 ft., whereas an indirectly coupled (intermediate heat exchanger) liquid metal reactor would weigh 1,030,000 pounds (515 tons) and have a maximum diameter of 21 ft. These estimates are based on a reactor producing 1000 MW(t) power having a lifetime of 18,000 hours. The gas cooled reactor was selected as representative of advanced reactor concepts. Direct coupling of the gas-cooled reactor to a two-phase liquid metal MHD device appears feasible;

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 911 300 16/4 20/3 10/2 10/1
GRUMMAN AEROSPACE CORP BETHPAGE N Y

Power Converter Nose Cone. (U)

DESCRIPTIVE NOTE: Final rept. 9 Feb-29 Dec 72,

MAR 73 400 Kolbert, Melvin ;

CONTRACT: F08635-72-C-0112

PROJ: AF-2508

TASK: 250805

MONITOR: AFATL

TR-73-58

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, *AERODYNAMIC HEATING),
(*NOSE CONES, *THERMOELECTRICITY), PROJECTILE FUZES,
ARMING DEVICES, SAFETY, THERMOCOUPLES, WIND TUNNELS,
STORAGE, FEASIBILITY STUDIES, THERMODYNAMICS, IGNITION,
BISMUTH ALLOYS, TELLURIUM ALLOYS, LEAD ALLOYS, (U)
TELURIDES, DOPING, MANUFACTURING (U)
IDENTIFIERS: 20-MM PROJECTILES

The report covers the application of aerodynamic heat as a means of generating usable electrical power for fuzing and arming circuits in a projectile. A 20mm projectile was chosen for sizing purposes. The program concludes that power sources of this type are inherently safer than and can be produced at prices competitive with batteries. (Author) (U)

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AD- 873 240

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 873 240 7/4 10/3
AMERICAN UNIV WASHINGTON D C

Research on Electrochemical Energy Conversion Systems. (U)

DESCRIPTIVE NOTE: Interim technical rept. no. 8 May-

Nov 69,

JUL 70 41P

Daryl H. ; Thompson, Charles D. ;

CONTRACT: DA-44-009-AMC-1386(T)

PROJ: DA-1-T-061102-A-34-A

TASK: 1-T-061102-A-34A00

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Interim technical rept. no. 7, AD-863 071.

DESCRIPTORS: (*ELECTROCHEMISTRY, *ENERGY CONVERSION),
(*WATER, CHEMICAL ANALYSIS), (*ELECTROLYTES, ORGANIC COMPOUNDS), (*BATTERY COMPONENTS, ELECTROLYTES),
ELECTRODES, ORGANIC NITROGEN COMPOUNDS, POLARIZATION, (U)
IDENTIFIERS: BENZENE/DINITRO, BENZOFURAZAN OXIDE, BUTYROLACTONE, NITRO COMPOUNDS, *ORGANIC BATTERIES (U)

The investigation of electrochemical energy conversion systems has involved work on three tasks. The first deal with high energy galvanic cells of the type applicable to vehicle propulsion. Attention has been directed toward the cathode depolarizer problem, particularly the mechanism of reduction of the benzofuroxan type structure. Progress has been made in developing methods for identifying and separating benzofuroxan from its reduction products. An improved method for the determination of water in organic electrolytes has been developed. This method, based on the lead tetraacetate reaction, is more sensitive and accurate in the 0 to 100 ppm range than present methods. The second task deal with the mathematical analysis of electrochemical energy conversion processes. The Hartley regression method has been applied to the Volmer equation describing the net current at an electrode during an activation controlled process. The method appears to offer a method of calculating the kinetic parameters without using the questionable assumptions made in the Tafel type of treatment. The third task, of an exploratory nature, (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 864 962 1/3 10/2 21/6
SILVERSTEIN (CALVIN C) BALTIMORE MD

A Survey of Advanced Energy Conversion Systems and Their Applicability to Army Aircraft Propulsion Requirements.

(U)

DESCRIPTIVE NOTE: Final rept.,

OCT 63 177P Silverstein, Calvin C. ;

REPT. NO. SIL-103

CONTRACT: DAAJ02-69-C-0001

PROJ: DA-1-G-162204-A-014

TASK: 1-G-162204-A-01409

MONITOR: USAAVLABS TR-69-81

UNCLASSIFIED REPORT

DESCRIPTORS: (*ARMY AIRCRAFT, *PROPULSION SYSTEMS), (*HELICOPTER ENGINES, *ENERGY CONVERSION), BRAYTON CYCLE, RANKINE CYCLE, THERMODYNAMIC CYCLES, GAS TURBINES, FUEL CONSUMPTION, FUEL CELLS, MAGNETOHYDRODYNAMIC GENERATORS, GENERATORS, THERMIONIC CONVERTERS, THERMOELECTRICITY, RADIOACTIVE ISOTOPES, AIRCRAFT NUCLEAR PROPULSION, HEAT, SUPERCONDUCTORS, ELECTRIC MOTORS, MILITARY REQUIREMENTS
IDENTIFIERS: *N:ERCOOL REHEAT CYCLE, *RADIOISOTOPE HEAT SOURCES, *THERMOELECTRIC POWER GENERATION (U)

A survey of advanced energy conversion methods and an evaluation of their applicability to Army aircraft propulsion requirements were carried out. Systems surveyed included: closed Brayton cycle, Rankine cycle, intercool-reheat cycle, fuel cells, MHD converters, thermionic converters, thermoelectric converters, radioisotope heat sources, and nuclear reactor heat sources. Information was also obtained on conventional and superconducting motors, which are required to convert the output of direct electrical generators to shaft power. (Author) (U)

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AD- 863 071

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 863 071 10/1 10/3
AMERICAN UNIV WASHINGTON D C

Research on Electrochemical Energy Conversion Systems.

(U)

DESCRIPTIVE NOTE: Interim technical rept. no. 7, Nov 68-May 69,

JUL 69 28P Foley, Robert T. ; Bomkamp,

Daryl H. ;

CONTRACT: DA-44-009-AMC-1386(T)

PROJ: DA-1-T-061102-A-34-A

TASK: 1-T-061102-A-34-A-00

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Interim technical rept. no. 6, AD-852 875.

DESCRIPTORS: (*ELECTROCHEMISTRY, *ENERGY CONVERSION), (*LITHIUM, *ANOD:*(ELECTROLYTIC CELL)), (*BATTERY COMPONENTS, ELECTROLYTES), (*ELECTROLYTES, ORGANIC COMPOUND), ORGANIC SOLVENTS, ELECTROLYTIC CELLS, FUEL CELLS, (U) FUEL CELLS
IDENTIFIERS: *ELECTRIC POWER DEMAND, ORGANIC BATTERIES (U)

The investigation of electrochemical energy conversion systems has involved work on three tasks. The first deals with high energy galvanic cells, particularly cells based on non-aqueous organic solvents. Preliminary to the investigation of cathode depolarizers based on nitrogen heterocyclic compounds some measurements were made on the chemical stability of Li in saturated solutions of organic depolarizers. Rough determinations indicate that Li is stable in the presence of compounds with the furan type structure. The second task deals with the mathematical analysis of electrochemical energy conversion processes. Analyses of vehicle velocity-acceleration profiles were made which will be used as an aid in sizing batteries to be used in vehicle propulsion. Postulates were made of typical vehicle operation, including a velocity-acceleration-time power requirement load profile. This profile will allow estimation of battery requirements to operate a vehicle in a typical driving situation.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 861 953 10/2
MASSACHUSETTS INST OF TECH CAMBRIDGE SPACE PROPULSION
LAB

Research on New Concepts on Energy
Conversion.

(U)

DESCRIPTIVE NOTE: Technical progress rept. no. 1
(Annual), 1 Nov 68-31 Oct 69,
NOV 69 23P Kennebrock, Jack L. ;
CONTRACT: F33615-69-C-1226
PROJ: AF-3145

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMIC
GENERATORS), (*MAGNETOHYDRODYNAMIC GENERATORS,
RELIABILITY), ELECTRIC PROPULSION, RANKINE CYCLE, PLASMA
GENERATORS, STABILITY, ELECTRIC DISCHARGES, IONIZATION,
REPORTS (U)
IDENTIFIERS: ELECTROTHERMAL INSTABILITY (U)

This report gives a summary of the status of
research on the M.I.T. nonequilibrium MHD
generator, and a report on progress for the period
November 1968 to October 1969. The limitations
imposed on generator performance by bulk
instabilities, wall layer instabilities, and end
shorting are described, and possible solutions for
these problems are given. Progress for the year
includes more detailed diagnosis of the generator,
repair of the inert gas heater, development of a
coaxial preionizer, development of a slanted
electrode wall, further experimental study of
electrothermal instabilities, and calculation of
current distributions due to simplified boundary
conditions in unstable plasmas. (Author)

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AD- 852 875

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 852 875 '0/1 7/4
AMERICAN UNIV WASHINGTON D C

Research on Electrochemical Energy Conversion
Systems.

(U)

DESCRIPTIVE NOTE: Interim technical rept. no. 6,
FEB 69 35P Foley, Robert T. ; Bomkamp,
Daryl H. ; Baird, W. Rodney ;
CONTRACT: DA-44-009-AMC-1386(T)
PROJ: DA-1-T-061102-A-34-A
TASK: 1-T-061102-A-34-A-00

UNCLASSIFIED REPORT

Availability: Microfiche only after original copies
exhausted.
SUPPLEMENTARY NOTE: See also rept. no. 5 dated Nov 68,
AD-846 063.

DESCRIPTORS: (*ELECTROCHEMISTRY, *ENERGY CONVERSION),
(*SOLUBILITY, *OXYGEN), (*EXCHANGE REACTIONS,
*CATALYSTS), FUEL CELLS, CARBONATES, PROPANE,
SULFOXIDES, LACTONES, FORMAMIDES, DEUTERIUM, HYDROGEN,
METHANE, SURFACE PROPERTIES, REACTION KINETICS (U)
IDENTIFIERS: BUTYROLACTONE, DMSO(DIMETHYLSULFOXIDE),
FORMAMIDE/DIMETHYL, LITHIUM PERCHLORATE, PROPYLENE
CARBONATE, SULFOXIDE/DIMETHYL, VOLTAMMETRY (U)

The investigation of electrochemical energy
conversion systems has involved two specific tasks.
The first has dealt with measurements of the
solubility of oxygen in organic liquids which might
provide the basis for high energy batteries. The
second task deals with the mathematical analysis of
electrochemical energy conversion devices.

Attention was given to the solution of kinetic
equations describing the hydrogen-deuterium exchange
of an hydrocarbon on a catalytic surface saturated
with deuterium. Kinetic expressions for a five
step successive reaction for methane are solved by
matrix techniques. These techniques should be
conveniently handled by a digital computer and the
expressions can be corrected for temperature, flow
rates, and other experimental parameters.
(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 836 279

10/2

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no.

18, 1 Dec 67-31 May 68.

JUN 6d 22P Kernebrock, Jack L. ;

CONTRACT: F33615-67-C-1148

PROJ: AF-3145

TASK: 314526

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMIC GENERATORS), FEASIBILITY STUDIES, DESIGN, RANKINE CYCLE, SPACE FLIGHT, NUCLEAR POWER PLANTS, ELECTRIC POWER PRODUCTION, HALL EFFECT, PERFORMANCE(ENGINEERING), OPERATION, CIRCUITS (U)

IDENTIFIERS: *NONEQUILIBRIUM MAGNETOHYDRODYNAMIC GENERATORS (U)

This report is intended to review progress in a continuing study of advanced concepts in energy conversion. The objectives of this program are to identify promising new methods of energy conversion, and to carry out the research required to demonstrate their technical feasibility. The feasibility of Rankine-cycle space power systems incorporating nonequilibrium magnetohydrodynamic generators has been explored. For some time, the major effort has been directed toward obtaining a basic understanding of the behavior of such generators, by operating and analyzing a generator of realistic size.

(Author) (U)

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AD- 824 666

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 824 666

10/1 10/2

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no.

17, 1 Sep-30 Nov 67.

DEC 67 25P Kernebrock, J. L. ;

CONTRACT: F33r15-67-C-1148

PROJ: AF-3145

TASK: 314526

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, *MAGNETOHYDRODYNAMIC GENERATORS), RANKINE CYCLE, FEASIBILITY STUDIES, POWER EQUIPMENT (U)

The principal result of the investigation is that, near open circuit, the dominant loss in the large, supersonic nonequilibrium MHD generator studied here is due to shorting by the end loops. The loss is more severe than in equilibrium generators because the ends are coupled to the active section of the generator by layers of highly conducting gas along the electrodes. A simple model based on these ideas explains the variations of transverse and axial electric fields along the generator's length. One result of the comparison of the model with the data is an estimate for the effective bulk Hall parameter. It varies from unity to 1.6 as the microscopic Hall parameter varies from 4 to 5.4. The effective value may be determined by electrothermal wave instabilities. The axial short so severe as to prevent the generator's producing more than a tiny fraction of its ideal Hall field. Thus, it behaves essentially as a continuous electrode generator. As such, it has induced conductivities near short circuit which are at least 5 times those that are possible without nonequilibrium ionization. A possible cure for the shorting is to extend the magnetic field far forward and aft of the active section. Another is to quench the conductivity at the exit of the active section. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 824 098 10/2 20/9
 ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE
 STATION TENN

EXPERIMENTAL PERFORMANCE OF A HALL
 MAGNETOHYDRODYNAMIC ELECTRIC POWER GENERATOR. (U)

DESCRIPTIVE NOTE: Final rept. 28 Feb-24 May 67,
 DEC 67 66P LeBoeuf, R. J.; McNeese,

J. D.;
 REPT. NO. AEDC-TR-67-250
 CONTRACT: AF 40(600)-1200
 PROJ: AF-5350, ARO-RW0637
 TASK: 535004

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with ARO,
 Inc., Tullahoma, Tenn.

DESCRIPTORS: (*MAGNETOHYDRODYNAMIC GENERATORS, *HALL
 EFFECT), (*ENERGY CONVERSION, MAGNETOHYDRODYNAMIC
 GENERATORS), (*ELECTRIC POWER PRODUCTION,
 MAGNETOHYDRODYNAMIC GENERATORS), MAGNETOHYDRODYNAMICS,
 GAS IONIZATION, GAS GENERATING SYSTEMS, COMBUSTION,
 OXYGEN, POTASSIUM COMPOUNDS, HYDROXIDES, ETHANOLS,
 PROPELLANTS, MAGNETIC FIELDS, ELECTROMAGNETS, DIFFUSERS,
 RESISTORS, CIRCUITS, PLASMAS(PHYSICS), FLUID FLOW,
 PERFORMANCE(ENGINEERING) (U)

A test program was conducted on a Hall
 Magnetohydrodynamic generator. The internal
 dimensions of the generator channel diverged from 4
 in. in height at the channel inlet to 6 in. in height
 at the channel exit, and the width was 2 in. along
 the 48-in. length of the channel. The plasma was
 provided by a gaseous oxygen/PP-1 combustor with a
 Mach number 1.6 nozzle. The propellants were
 seeded with potassium hydroxide (KOH) dissolved in
 ethyl alcohol to produce a high ion concentration in
 the exhaust stream. The generated power was
 dissipated through a resistor load bank with a
 variety of parallel and series resistance
 configurations. Operating conditions were
 nominally as follows: combustor chamber pressure,
 46 psia; KOH concentration, 1.3 percent of total
 propellant weight flow, magnetic field, 20,000 gauss;
 and load bank resistance, from 0 to 24.9 ohms.
 Tabulations of combustor performance data and of
 the generator electrical data are presented. (U)

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 823 243 9/1 10/1
 GENERAL MOTORS CORP KOKOMO IND DELCO RADIO DIV

STUDY OF GERMANIUM DEVICES FOR USE IN A
 THERMOPHOTOVOLTAIC CONVERTER. (U)

DESCRIPTIVE NOTE: Rept. no. 2 (Final) 1 Jan-1 Aug
 67, NOV 67 144P Beck, R. W.; Sayers, E. H.

CONTRACT: DA-28-043-AMC-02543(E)
 PROJ: DA-1C6-22001-A053
 TASK: 1C6-22001-A053-01
 MONITOR: ECOM 02543-F

UNCLASSIFIED REPORT

DESCRIPTORS: (*PHOTOELECTRIC CELLS(SEMICONDUCTOR),
 *ENERGY CONVERSION), GERMANIUM, THERMOELECTRICITY,
 GALLIUM, STABILITY, EPITAXIAL GROWTH, MANUFACTURING,
 DOPING, SUBSTRATES, GENERATORS, COATINGS,
 CARRIERS(SEMICONDUCTORS) (U)

Investigations of P+N and non-absorptive
 devices, which are reported in detail in the first
 progress report, are summarized. Current work
 includes engineering investigations and optimization
 of the N/P+ fabrication process. Power outputs
 in excess of 900 mw per device in a flux of 14.0
 watt/sq cm have been observed on optimized units.
 Measurements of effective minority carrier lifetime
 and equivalent nonchromatic conversion efficiency are
 described. An experimental model is presented
 which can be used to explain previous vacuum
 degradation data as well as to predict the behavior
 of a new coating. Detailed data on Sb203
 coatings are given and this material is the best
 found to date for the TPV application. The
 design and fabrication of a thermophotovoltaic
 generator model is described. The model is powered
 by an electrically heated silicone carbide globar,
 and a forced convection cooled by water. The active
 cell array consists of 132 series interconnected
 cells arranged on a 3.50 in dia. by 3 in high shell.
 The packing density of the cells is greater than
 90%. Power output obtained has been 57.65 watts
 at a radiant flux density of 8.67 watts/sq cm, and
 with a water coolant flow rate of 4 gpm. Weight of
 the system, without globar, is 7.01 lbs. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 822 370 10/1 18/5

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no. 16, 1 Jun-31 Aug 67.

16, 1 Jun-31 Aug 67, SEP 67 20P Kerrebrock, Jack L.; Hoffman, Myron A.;

CONTRACT: F33615-67-C-1148

PROJ: AF-5350

TASK: 535004

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMIC GENERATORS), (*MAGNETOHYDRODYNAMIC GENERATORS, NUCLEAR POWER PLANTS), SPACECRAFT, FEASIBILITY STUDIES, RANKINE CYCLE, ALKALI METALS, VAPORS, EXHAUST GASES, SPACE PROPULSION, HEAT TRANSFER, ALKALI METALS, CONDENSATION, IONIZATION, DROPS, POWER SUPPLIES, HEAT SINKS (U)

This report is intended to review progress in a continuing study of advanced concepts in energy conversion. The objectives of this program are to identify promising new methods of energy conversion, and to carry out the research required to demonstrate their technical feasibility. Exploration has been made of the feasibility of Rankine-cycle space power systems incorporating nonequilibrium magnetohydrodynamic generators. At present, the major effort is directed toward obtaining a basic understanding of the behavior of such generators, by operating and analyzing a generator of realistic size. The system aspects of nuclear-MHD power systems are also being explored as well as the electrical behavior of alkali-metal vapors. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 821 597 10/2 10/1 20/3

THERMO ELECTRON ENGINEERING CORP WALTHAM MASS

PLANAR CONVERTERS FOR RADIOISOTOPE GENERATORS. (U)

DESCRIPTIVE NOTE: Final rept. 1 May 66-30 Apr 67, SEP 67 240P Athanis, Thomas; van Someren, Laurence O.;

REPT. NO. TE4063-111-67

CONTRACT: AF 33(615)-5094

PROJ: AF-8173

TASK: 817305

MONITOR: AFAPL TR-67-99

UNCLASSIFIED REPORT

DESCRIPTORS: (*THERMIONIC CONVERTERS, FEASIBILITY STUDIES), (*ENERGY CONVERSION, THERMIONIC EMISSION), CESIUM, TUNGSTEN, ION SOURCES, RHENIUM, SINGLE CRYSTALS, METALLOGRAPHY, RADIOACTIVE ISOTOPES, PRESSURE, TEMPERATURE, LIFE EXPECTANCY, OPTICAL ANALYSIS, ELECTRON MICROSCOPY (U)

Specific tasks under this program include investigations of the feasibility of a dynamic cesium flow system (Integral Cesium Reservoir) and the development and evaluation of single-crystal tungsten emitters incorporated in planar thermionic converters. During this program an Integral Cesium Reservoir (ICR) was designed, fabricated and tested. The tests demonstrated the feasibility of the ICR and indicated that the dependence of the converter pressure on the reservoir temperature was reduced by a factor of two when the present ICR instead of a conventional reservoir was used as the cesium source in the converter. Two planar thermionic converters were constructed and tested. Both converters used single-crystal tungsten emitters of the (110) crystallographic orientation and polycrystalline molybdenum collectors with an interelectrode spacing of about 2 mils. The converters operated on a steady-state basis at an emitter temperature of 2000 K and an output voltage of 0.7 volt. One converter completed 3100 hours of continuous operation with a power density output of 21 W/sq cm for the last 2300 hours. Operation of the other converter was discontinued after 870 hours due to performance degradation. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 818 632 20/9

ADVANCED KINETICS INC COSTA MESA CALIF

PLASMA-KINETIC ENERGY - RF CONVERSION. (U)

DESCRIPTIVE NOTE: Final rept. on Phase 4,
JUL 67 86P Waniek, R. W.; Fleischman,
T. H.; Saviole, W. R.; Hsu, J. S.; Grannan,
R. T. ;

CONTRACT: AF 30(602)-4169

PROJ: AF-5573

MONITOR: RADC TR-67-270

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Continuation of Contract AF
30(602)-2981.

DESCRIPTORS: (*KINETIC ENERGY, *RADIOFREQUENCY POWER),
(*ENERGY CONVERSION, *PLASMA MEDIUM), DETECTION, X BAND,
MAGNETIC FIELDS, ELECTRODES, ELECTRON DENSITY, ELECTRIC
DISCHARGES (U)

This report describes a theoretical and
experimental investigation of RF emission from a
magnetized plasma. Very intense bursts of
microwave energy have been measured from a high
energy discharge through a P.I.G. type magnetic
field configuration. Peak powers of above 1kW
have been measured in pulses of X-band energy
typically tens to hundreds of nanoseconds long.
The experimental program is described and some
theoretical explanations of the results are included.
(Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 818 405 10/2

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF
ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Supplement to final rept. 1 Sep 63-31
Aug 66.

JUN 67 4P Jackson, W. D. ;

CONTRACT: AF 33(615)-1083, AF 33(615)-3489

PROJ: DA-5350

TASK: 535004

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with
Illinois Univ., Chicago. Dept. of Energy
Engineering.

DESCRIPTORS: (*ENERGY CONVERSION, *BIBLIOGRAPHIES),
(*MAGNETOHYDRODYNAMIC GENERATORS, BIBLIOGRAPHIES),
MAGNETOHYDRODYNAMICS, INDUCTANCE, INDUCTION MOTORS,
LIQUID METALS, BRAYTON CYCLE, ELECTRIC POWER PRODUCTION,
SPACECRAFT, THESES (U)

The report contains a list of publications and
theses on magnetohydrodynamic generators. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 817 856 10/1
MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

LIQUID METAL MAGNETOHYDRODYNAMICS. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no.

2, 12 Apr-11 Jul 67, Jackson, William D.; Pierson,

JUL 67 2P Edward S.; Patrick, Michael; Roberts, John J.;

Brown, George A.;

CONTRACT: F33615-67-C-1375

PROJ: AF-5350

TASK: 535004

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Illinois Univ., Chicago and Argonne National Lab., Ill.

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), (*MAGNETOHYDRODYNAMIC GENERATORS, LIQUID METALS), DESIGN, AUXILIARY POWER PLANTS, POWER PLANTS(ESTABLISHMENTS), SPACEBORNE, RESEARCH MANAGEMENT, DIRECT CURRENT, SODIUM, POTASSIUM (U)
IDENTIFIERS: CONDENSING EJECTORS, INDUCTION GENERATORS (U)

This report gives a brief review of progress during the period April 12, 1967 to July 11, 1967 on a research program to develop liquid metal magnetohydrodynamic electrical power systems. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 815 135 10/1 10/2
MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no.

15, 1 Mar-31 May 67, Kerrebrock, Jack L.;

JUN 67 17P

CONTRACT: F33615-67-C-1148

PROJ: AF-5350

TASK: 535004

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supplement to Quarterly progress rept. no. 86.

DESCRIPTORS: (*ENERGY CONVERSION, FEASIBILITY STUDIES), (*MAGNETOHYDRODYNAMIC GENERATORS, PLASMA MEDIUM), VAPORS, CESIUM, HELIUM, ENERGY, TRANSPORT PROPERTIES, MATHEMATICAL ANALYSIS (U)
IDENTIFIERS: NONEQUILIBRIUM (U)

This report is intended to review progress in a continuing study of advanced concepts in energy conversion. The objectives of this program are to identify promising new methods of energy conversion, and to carry out the research required to demonstrate their technical feasibility. An exploration has been made of the feasibility of Rankine-cycle space power systems incorporating nonequilibrium magnetohydrodynamic generators. The program comprises two major efforts. One of these has been a study of the electrical behavior of condensing nonequilibrium alkali-metal plasmas. This program seems, for the purposes of nonequilibrium generators, to have reached conclusion. The facility and the techniques that have been developed in connection with this research will be applied to the study of metallic plasmas for other applications. The second major effort is a study of the characteristics of a large nonequilibrium generator. For practical reasons, in the experimental phase of this study, a cesium-seeded helium plasma is being used; however, the information obtained from this work will be directly applicable to generators operating with condensable plasmas.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 809 361 10/1
MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no. 14, 1 Dec 66-28 Feb 67,

MAR 67 2P Kerrebrock, Jack L. ;

CONTRACT: F33615-67-C-1148

PROJ: AF-5350

TASK: 535004

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, SCIENTIFIC RESEARCH), FEASIBILITY STUDIES, RANKINE CYCLE, MAGNETOHYDRODYNAMIC GENERATORS, ALKALI METALS, IONIZATION, VAPORS, DROPS, ELECTRODES, STABILITY (U)

This report gives a brief review of progress during the period December 1, 1966 to February 28, 1967 on a research program to develop new concepts in energy conversion. No detailed technical contributions are included. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 809 257 10/1
MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no. 13, 1 Sep-30 Nov 66,

DEC 66 10P Kerrebrock, Jack L. ;

CONTRACT: F33615-67-C-1148

PROJ: AF5350

TASK: 535004

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, FEASIBILITY STUDIES), RANKINE CYCLE, MAGNETOHYDRODYNAMIC GENERATORS, ELECTRON DENSITY, NOZZLE THROATS, HALL EFFECT, ELECTRIC FIELDS, NONEQUILIBRIUM FLOW, BOUNDARY LAYER, ELECTRIC CURRENTS, ELECTRICAL CONDUCTIVITY, DENSITY (U)

This report gives a technical review of progress during the period September 1, 1966-November 30, 1966 on a research program to develop new concepts in energy conversion. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 806 963 10/1 10/2 20/9
GENERAL MOTORS RESEARCH LABS WARREN MICHINVESTIGATIONS ON THE DIRECT CONVERSION OF NUCLEAR
FISSION ENERGY TO ELECTRICAL ENERGY IN A PLASMA
DIODE. (U)DESCRIPTIVE NOTE: Annual rept. no. 7, 1 Nov 65-31 Oct
66, OCT 66 88P Leffert, Charles B. ; Rees, David B. ;REPT. NO. GMR-615
CONTRACT: Nonr-3109(00)
PROJ: NR-099-345

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, *FISSION),
(*PLASMAS(PHYSICS), *ELECTRON DENSITY), (*THERMIONIC
CONVERTERS, PLASMAS(PHYSICS)), (*DIODES,
PLASMAS(PHYSICS)), NEON, ARGON, CESIUM, REACTION
KINETICS, ELECTRONS, TRANSPORT PROPERTIES, IONS
IDENTIFIERS: ELECTRON TRANSPORT (U)
(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 803 439 7/4 10/2
PENNSYLVANIA UNIV PHILADELPHIA ELECTRO-CHEMISTRY LAB

REVERSIBLE OXYGEN ELECTRODES. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 5, 15 Apr-14 Jul
66, OCT 66 158P Sepa, D. ; Wong, K. ; Beer, E. A. ; Damjanovic, A. ;CONTRACT: DA-33-043-AMC-01291(E)
PROJ: DA-1C014501A34A
TASK: 1C0-14501-A-34A-00
MONITOR: ECOM 01291-5

UNCLASSIFIED REPORT

DESCRIPTORS: (*FUEL CELLS, *ENERGY CONVERSION),
(*ELECTRODES, FUEL CELLS), (*OXYGEN,
REDUCTION(CHEMISTRY)), (*ELECTROCHEMISTRY, FUEL CELLS),
SULFURIC ACID, SOLUTIONS(MIXTURES), CATALYSTS, PLATINUM,
TUNGSTEN ALLOYS, BRONZE, OXIDATION REDUCTION REACTIONS,
HYDROGEN PEROXIDE (U)
IDENTIFIERS: REVERSIBLE OXYGEN ELECTRODES (U)

Inpile microwave measurements of electron density in neon-argon and argon-cesium plasmas generated by fission fragments are compared with values of electron density predicted from a reaction kinetics theory. The main purpose of the comparison is to assess the validity of a theory designed to describe the dominant production and loss processes in noble gas-cesium thermionic converters over a wide range of conditions. For the neon-argon system the measured and predicted values were in good agreement. For the argon-cesium system the agreement between theory and experiment was less satisfactory. The highest measured electron density at full reactor power was approximately twice the computed value. Furthermore the electron density was found to be extremely dependent upon the temperature of the cavity walls. No satisfactory explanation has yet been found for this behavior. Favorable electron transport properties are expected to make the fission-fragment-generated argon-cesium plasma a good candidate for use in a nuclear thermionic converter. Theoretical transport properties are reported for this plasma when the major ion loss mechanism is ambipolar diffusion to the thermionic diode electrodes. (U)

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The mechanism of oxygen reduction at Pt electrodes in acid(1 N an 0.1 N H2SO4) solutions is greatly affected by the presence of Cl(-) ions in the solution. The path changed from one in which O2 is reduced to H2O to the path in which O2 is reduced to H2O2. Tungsten bronzes are found to operate also after prolonged polarization. Depolarization of tungsten bronzes after long (20 days) polarization is probably due to residual impurities in the solution. When the solution is changed, the electrode potential for a given current density recovers its initial value. Fe(2+)/Fe(3+) and Ti(+)/Ti(3+) redox couples are considered as possible redox catalysts for oxygen reduction. The rates of electrode reactions for both couples are sufficiently high. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 801 852 10/2 10/3
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

INTERNATIONAL SYMPOSIUM (5TH) OF THE JOINT SERVICES
ELECTRICAL POWER SOURCES COMMITTEE, 1966. (U)

DESCRIPTIVE NOTE: Technical rept.,
OCT 66 11P Maycock, Paul D. ;
REPT. NO. ONRL-C-18-66

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTRIC POWER PRODUCTION, SYMPOSIA),
BATTERY COMPONENTS, ELECTRIC BATTERIES, FUEL CELLS,
SOLAR CELLS, NICKEL, CADMIUM, LEAD(METAL), INORGANIC
ACIDS, GRAPHITE, THERMOELECTRICITY, ELECTROCHEMISTRY,
POWER SUPPLIES, ENERGY CONVERSION (U)

This report reviews selected papers presented in
the fields of batteries and fuel cells, thermal
electricity. An Appendix is attached, giving
titles, authors' names and addresses, for 38 papers.
(Author) 15 (U)

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 801 246 10/2
HONEYWELL INC HOPKINS MINN ORDNANCE DIV

LOW INPUT VOLTAGE CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 8
(Final), 1 Mar 64-27 Jun 66,
SEP 66 175P Lingle, John T. ;Buren,
Francis W. ;Jenson, Kenneth J. ;
CONTRACT: DA-28-043-AMC-00030(E)
PROJ: DA-1C6-22001A-053
TASK: 1C6-22001A-053-05
MONITOR: ECOM 00030-F

UNCLASSIFIED REPORT

DESCRIPTORS: (*POWER TRANSFORMERS, ENERGY CONVERSION),
(*VOLTAGE REGULATORS, ENERGY CONVERSION), (*ENERGY
CONVERSION, POWER EQUIPMENT), SEMICONDUCTORS, CIRCUITS,
TRANSISTORS, INVERTERS, ELECTRIC POWER PRODUCTION,
THERMIONIC CONVERTERS, THERMOELECTRICITY, MAGNETIC
CORES, SEISMO MECHANISMS, FUEL CELLS, FUEL CONSUMPTION,
CONTROL SYSTEMS, OSCILLATORS, HEAT TRANSFER,
LEAD(METAL), GEOMETRY, THERMAL ANALYSIS
IDENTIFIERS: CONVERTERS, VOLTAGE (U)
(U)

The report investigates the development of low
input voltage converter-regulators (LIVCR) capable
of efficiently converting the low voltage power (0.4
to 4 volts) of single-cell energy conversion power
sources to a higher, more usable regulated voltage
(e.g., 28 vdc). LIVCR models with demonstrated
efficiencies between 70 percent and 90 percent were
achieved. The technical data, together with the
LIVCR models developed during this program, will
provide the power system designer with the tools to
design efficient, economical, and reliable power
systems utilizing low-voltage energy conversion
sources directly applicable to current and future
military requirements for light weight, portable
electrical power sources. As a recommendation,
future work might be directed toward the design of
specific power supplies for incorporation into
specific energy conversion power systems for silent
field applications. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 800 328

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ATOMICS INTERNATIONAL CANOGA PARK CALIF

BASIC RESEARCH IN THERMIONIC ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Technical summary rept. 1 Aug 65-31
Jul 66.

SEP 66 84P Warner, Charles ; Hansen, Lorin

K. ;

REPT. NO. AI-66-157

CONTRACT: Nonr-3192(00)

UNCLASSIFIED REPORT

DESCRIPTORS: (*THERMIONIC CONVERTERS, *ENERGY
CONVERSION), TEMPERATURE, ELECTRONS, BACKSCATTERING,
THERMIONIC EMISSION, ELECTROSTATIC FIELDS, DIODES, IONS,
LANGMUIR PROBES, IONIZATION, SPECTROSCOPY, COOLING,
NUMERICAL ANALYSIS, CESIUM, PLASMA SHEATHS, CATHODES,
ELECTRIC FIELDS (U)

IDENTIFIERS: SCHOTTKY EFFECT (U)

This report presents the results of the past year's
work in a continuing program to investigate basic
processes in thermionic energy conversion. The
subjects discussed are: Electron temperature in a
thermionic diode; Retarding field operation of
thermionic diodes; The anomalous Schottky
Effect; Theory of the ignited mode. (Author) (U)

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ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
VA

MHD Method for Producing Electrical Energy. (U)

APR 74 495P

A. E. ; Kirillin, V. A. ; Sheindlin,

REPT. NO. FSTC-HT-23-1403-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of unidentified Russian
language mono., Moscow, 1972 360p.

DESCRIPTORS: *Magneto-hydrodynamic generators,
*Electric power production, Electrodes, Materials,
Gas flow, Heat transfer, Translations. USSR (U)

This collection of articles discusses the following
aspects of MHD generators in successive sections:
Theory and calculation of flows, experimental
investigations, investigation of physical processes
and diagnostics, study of basic MHD unit equipment,
liquid metal MHD units, study of cycles and systems
of power plants with MHD generators and MHD
generator materials. Aspects of MHD generators
which occur repeatedly are studied of the insulating
walls, electrode walls, electrode materials and
configurations, plasma electrical conductivity with
various alkali metal additives and combustion
products of various fuels. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 786 757 10/1 10/2
BOOZ-ALLEN AND HAMILTON INC BETHESDA MD

Alternative Strategies for Optimizing Energy Supply, Distribution, and Consumption Systems on Naval Bases. Volume II. Advanced Energy Conservation Strategies.

DESCRIPTIVE NOTE: Final rept. Nov 73-Jan 74,
JAN 74 231P Consroe, T. ; Nicholas, J. ;
Nichols, J. ; Wulfinghoff, D. ; Mateyka, J. ;
CONTRACT: N62399-73-C-0029
MONITOR: CEL CR-74.007

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-777 471.

DESCRIPTORS: *Energy management, *Naval shore facilities, Solar heating, Fuel cells, Transportation, Heat engines, Technology, Cost effectiveness, Energy conservation, Cost analysis, Benefits, Thermionic converters, Solar collector
IDENTIFIERS: Cost benefit analysis, Electric power generation, Wind power, Solar air conditioning, Photovoltaic cells

The report describes five advanced strategies for optimizing energy supply, distribution, and consumption systems on naval bases: (1) Solar energy applications; (2) automated building control and monitoring systems; (3) electrochemical sources--fuel cells; (4) advanced transportation technology; and (5) total energy systems. For each advanced strategy, the report contains a technology assessment, a discussion of applicability to the Navy, a discussion of costs and benefits, and recommendations for Navy implementation. (Modified author abstract)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 786 700 10/1
RAND CORP SANTA MONICA CALIF

Coping with the Fuel Shortage: A Guide for Los Angeles Residents.

JAN 74 24P Graubard, M. H. ; Mutch, J. J. ;
REPT. NO. P-5154

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy management, *California, Industries, Transportation, Residential section, Commerce, Oils, Liquefied natural gas, Electricity, Fuels, Fuel consumption, Fuel shortages

IDENTIFIERS: *Energy consumption, *Los Angeles (California), *Energy conservation, Electric power consumption, Natural gas

Energy conservation measures that Los Angeles residents can take in their homes and travel are discussed. Report notes the amount of energy that each measure can be expected to save.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 786 685 10/2
AMERICAN UNIV WASHINGTON D C

Research on Electrochemical Energy Conversion Systems.

(U)

DESCRIPTIVE NOTE: Interim progress rept., no. 5, Oct 73-

Apr 74, JUL 74 37P Adams, Alayne A. ;Foley, Robert T. ;

CONTRACT: DAAG02-72-C-0084

PROJ: DA-T-161102-A-34-A

TASK: 1-T-161102-A-34-A-03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-780 952.

DESCRIPTORS: *Fuel cells, *Electrolytes, *Corrosion, Sulfonic acids, Steel, Nickel alloys, Electrochemistry, Propane, Oxidation, Phosphoric acids, Performance(Engineering), Reliability(Electronics)

(U)

IDENTIFIERS: Hydrocarbon air fuel cells, Propane air fuel cells, Fuel cell electrolytes, Methane sulfonic acid/trifluoro, Steel 304, Nickel alloy Incoloy 825, Nickel alloy Hastelloy C, Nickel alloy Carpenter 20

(U)

The research on electrochemical energy conversion systems has involved work on two tasks: a search for electrolytes alternative to phosphoric acid for direct and indirect hydrocarbon-air fuel cells, and a study of the corrosion characteristics of electrolytes for intermediate-temperature hydrocarbon-air fuel cells. The anodic oxidation of propane and the reduction of oxygen (air) were studied in trifluoromethanesulfonic acid monohydrate. Three techniques were used, the galvanostatic pulse technique, the potential ramp technique, and cyclic voltammetry. All three techniques indicate that the enhanced electrode activity of propane in this electrolyte involves a mechanism different from that operating in phosphoric acid and apparently this reaction sequence does not involve certain undesirable intermediates. Preliminary corrosion tests of Steel 304, Incoloy 825, Hastelloy C, Carpenter 20 indicate that the Cf3SO3H.H2O electrolyte is substantially less corrosive than phosphoric acid.

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 786 451 10/2 20/9
MINNESOTA UNIV MINNEAPOLIS DEPT OF ELECTRICAL ENGINEERING

Study of Plasma Sheaths.

(U)

DESCRIPTIVE NOTE: Final rept. 1 Feb 73-31 Mar 74, APR 74 128P Oskam, Hendrik J. ;Shanan, Ramanuj ;

CONTRACT: F19628-73-C-0128

PROJ: AF-8659

TASK: 865902

MONITOR: AFCL TR-74-0221

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: *Thermionic converters, *Plasma sheaths, Diodes, Space charge, Differential equations, Computer programs, FORTRAN

(U)

IDENTIFIERS: DIODE computer program

(U)

A theoretical model of a thermionic gas diode with ion injection through the anode was developed. Charged particle currents due to the electric field as well as due to charged particle density gradients were incorporated in the model. This made it possible to study the effect of ion injection on the magnitude and location of the potential barrier in front of the hot cathode. The model was solved numerically for various experimental conditions. The results obtained explained the previously observed large space charge neutralization efficiencies of the injected ions. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 786 362 7/4
TEXAS UNIV AUSTIN DEPT OF CHEMISTRYTriboluminescence and Triboelectrification by the
Motion of Mercury over Glass Coated with
Scintillator Dyes.

(U)

DESCRIPTIVE NOTE: Doctoral thesis,
JUN 73 7p Keszthelyi, Csaba P. ;Bard,
Allen J. ;
CONTRACT: DA-ARO-D-31-124-73-G34
MONITOR: AROD 8352.17-C

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of the
Electrochemical Society, v120 n12 p1726-1729 Dec 73.
SUPPLEMENTARY NOTE: Presented at the Southwest
Regional Meeting of the American Chemical Society,
Baton Rouge, La., 6-8 Dec 72. Pater 48.

DESCRIPTORS: *Luminescence, *Dyes, *Static
electricity, Mercury, Coatings, Glass,
Scintillation, Energy conversion
IDENTIFIERS: Triboluminescence

(U)
(U)

The conversion of mechanical energy into electrical
energy and light (triboelectrification and
triboluminescence) by the movement of mercury over
glass surfaces coated with scintillator compounds was
investigated. The motion of mercury over the coated
glass involves the build-up of potential differences
in excess of 20V; the nature of these triboelectric
potentials differs significantly from those observed
in the absence of scintillator coating. Twelve
scintillator compounds were investigated with the
observed luminescence being characteristic of the
coating material. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 785 419 20/9 10/2
TENNESSEE UNIV SPACE INST TULLAHOMA

MHD Energy Conversion.

(U)

DESCRIPTIVE NOTE: Final rept. 1 Sep 68-31 Aug 74,
AUG 74 28P
CONTRACT: F44620-69-C-0031
PROJ: AF-6813, AF-9752
TASK: 681308, 975202
MONITOR: AFOSR TR-74-1503

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: *Magnetohydrodynamic generators,
*Magnetohydrodynamics, Energy conversion,
Instability, Hall effect, Surfaces, Combustion,
Electron energy

(U)

IDENTIFIERS: Themis project, Plasma
instabilities

(U)

Theoretical and experimental investigations were
made on a number of phenomena in magnetohydrodynamics
that are pertinent in the combustion gas driven MHD
generators. Different types of generators of
diagonal conducting wall designs were studied and a
number of different fuels and seed were used in these
investigations. Both liquid and solid fuels were
used in the experiments. Optical measurements were
made to measure the relative temperature and absolute
velocity of the plasma. Three-dimensional current
distributions were measured along with analysis.
(Modified author abstract)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 783 901 10/2
ADVANCED KINETICS INC COSTA MESA CALIF

Chemical to Electromagnetic Energy Conversion Techniques.

(U)

DESCRIPTIVE NOTE: Final rept. May 72-Mar 74,
JUN 74 157P Wanitek, Ralph W. ;
CONTRACT: 330602-72-C-0401
PROJ: AF-4505
TASK: 450603
MONITOR: RADC TR-74-154

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: *Energy conversion, *Pulse generators, Magnetic fields, Exothermic reactions, Detonation waves, Pistons, Compression, Explosives, Flux(Rate), Interactions, Projectiles, Magnets, Electromagnetic pulses, Acceleration, Deceleration, Multiple operation

(U)

The objective of the work was to develop techniques for conversion of the very high density energy stored chemically to pulses of electrical energy. Reliable low cost single shot converters have been demonstrated by investigators in explosive flux compression technology. The techniques investigated are for use in high power lightweight transmitter experiments in support of TP05. Multiple shot magnetic flux compression concepts were analyzed, experimentally verified, and categorized as to potential device use. The concepts investigated have the capability for multiple pulse operation and all involved the rapid deceleration of either explosively driven shock fronts or explosively driven metallic projectiles in a magnetic field. The effects of physical parameters of the decelerated medium and the magnetic field were experimentally verified and parameter tradeoffs were developed.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 783 821 20/12 10/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE VA

Devices Based on Thermoelectrical Phenomena,

(U)

APR 74 24P Gorodetskii, A. F. ;
Kravchenko A. F. ; Samoilov, E. M. ;
REPT. NO. FS.7-HT-23-45-74

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of mono. Osnovy Fiz. Poluprovod. 1 Poluprovod. Prib., n.p., 1966 p315-326.

DESCRIPTORS: *Thermoelectric power generation, *Semiconductor devices, Thermoelectricity, Electric power production, Refrigeration systems, Efficiency, Peltier effect, Translations, USSR

(U)

The energy fundamentals of thermoelectric generators are presented, for the direct conversion of thermal energy into electrical at high efficiency and to produce cold in refrigeration units. The conditions under which the efficiency of an actual thermoelectric generator will be at a maximum are described. Thermostating radioelectric devices are also discussed.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 783 561 14/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Determination of the Energy of Pulse Current
by a Thermo-Electric Converter,

JUN 74 11P Kozynrev, B. P. ;Sneveleva,

T. Yu. ;
REPT. NO. FTD-HT-23-1529-74

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of
Elektrotehnicheskii Institut, Leningrad. Izvestiya
(USSR) v71 n99 p34-37 1972, by Robert D. Hill.

DESCRIPTORS: *Pulse integrators, *Measuring
instruments, Converters, Thermocouples,
Integrators, Energy, Electric charge,
Translations, USSR

IDENTIFIERS: Thermoelectric generators

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(U)

A description is given of two designs of thermal
converters for the integration of currents of more
than 10 microamps in low-resistance circuits. The
frequency range of the instruments is 0-25 mHz, and
the time constant is within 5-10 minutes.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 782 888 10/2 13/1
ARIZONA STATE UNIV TEMPE DEPT OF MECHANICAL
ENGINEERING

An Inter-cell Heat Pipe for Fuel Cell and
Battery Cooling.

(U)

DESCRIPTIVE NOTE: Final rept. Jun 72-Jul 73,
DEC 73 44P Jacobson, Dean L. ;

CONTRACT: F30602-72-C-0418

PROJ: AF-3145

TASK: 314521

MONITOR: AFAPL TR-74-5

UNCLASSIFIED REPORT

DESCRIPTORS: *Fuel cells, *Cooling, *Heat pipes,
Heat transfer, Electrochemistry, Energy
Conversion, Heat sinks, Electric batteries,
Capillaries

(U)

IDENTIFIERS: *Electrochemical energy conversion,
*Capillary pumping

(U)

A planar (rectangular cross section) heat pipe
was designed to transfer 2000 watts at 115C plus or
minus 12C. The evaporator area was fixed at
30.48cm by 12.7cm per side so that the design heat
flux was 3.45 watts/sq cm. The heat pipe was
tested with electrical heaters to simulate waste heat
from two adjacent high power density fuel cell or
battery modules. The device was constructed from
two milled copper plates which were electron beam
welded to produce the completed structure. The
finished heat pipe thickness was 1.27cm. A single
layer of 100 mesh copper screen covered rectangular
milled capillary grooves. Triply distilled,
deionized water was chosen as the working fluid.
(Modified author abstract)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 781 997 20/5 20/9
UNITED AIRCRAFT RESEARCH LABS EAST HARTFORD CONN

Investigation of the Feasibility of a
Magnetohydrodynamic Laser.

(U)

DESCRIPTIVE NOTE: Final rept. 3 Jun 71-30 Apr 74,
MAY 74 92P Bullis, Robert H. ; Churchill,
Thomas L. ; Nighan, William L. ; Erlandsen, Peter
O. ; Schulman, Elliot R. ;
REPT. NO. UARL-N921308-4
CONTRACT: N60921-71-C-0279, ARPA Order-2032

UNCLASSIFIED REPORT

DESCRIPTORS: *Magnetohydrodynamic generators,
*Carbon dioxide lasers, Plasmas(Physics),
Energy/ conversion, Electric power production,
Molecular electronics, High power, Nozzle gas
flow, Feasibility studies

(U)

The investigation is directed towards the
evaluation of the feasibility of a
magnetohydrodynamic laser concept (MHD) employing
nonequilibrium electron kinetics to provide efficient
energy transfer in a molecular laser system. To
achieve this goal comprehensive modeling of the MHD
plasma which has been based upon a detailed knowledge
of electron and heavy particle kinetics has been
developed. Experimental investigations conducted
on small scale laminated and solid wall generator
configurations have confirmed theoretical modeling
predictions and indicate the potential attractiveness
of the MHD concept for high power laser
applications. Major emphasis in the report has been
placed on the additional experimental information
obtained from small scale generator tests as well as
experimental results obtained in a generator
configuration suitable for optical power extraction
investigations. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 781 926 10/2
BOSTON COLL CHESTNUT HILL MASS DEPT OF PHYSICS

Investigation of Organic Semiconductor for
Photovoltaic Application.

(U)

DESCRIPTIVE NOTE: Final rept. 1 Jul 70-31 Dec 73,
APR 74 44P Fang, Pao-Hsein ;
CONTRACT: F19628-71-C-0093
PROJ: AF-8659
TASK: 865901
MONITOR: AFRL TR-74-0192

UNCLASSIFIED REPORT

DESCRIPTORS: *Semiconductors, *Organic compounds,
*Photovoltaic effect, *Solar cells, Measurement,
Aging(Materials), Transport properties,
Mathematical models, Electrodes, Metals
IDENTIFIERS: *Naphthalenes, *Organic
semiconductors

(U)

The work is oriented toward five areas: (1)
measurement of the photovoltaic conversion efficiency
as a solar cell, (2) analysis of the spectral
response of the quantum yield, (3) analysis of
the transient response with a pulsed light source,
(4) model analysis of the configuration of the
organic semiconductor solar cell and (5) the
aging phenomenon of tetracene solar cells. The
work in areas (1) to (4) is completed
together with physical interpretations. Area
(5), which requires measurements over an extended
period of time, but is of fundamental importance from
the point of view of practical application, has not
been able to be completed before the termination of
the present contract, and a stage of physical
interpretation has not been reached. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 781 223 20/9
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Scientific Seminar on Energy Exchange in
Plasma Devices,

JUL 73 5P Panevin, I. G. ;
REPT. NO. FSTC-HT-23-1832-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Fizika i Khimiya
Obrabotki Materialov (USSR) n3 p156-157 1973.

DESCRIPTORS: *Plasma devices, Energy conversion,
Translations, USSR

Scientific Seminar on Energy Exchange in Plasma
Devices--Translation.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 781 204 10/2 7/4
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Macrokinetic Processes in Porous Media
(Fuel Cells),

MAY 74 579P Chizmadzhev, Yu. A. ; Martin,
V. S. ; Tarasevich, M. R. ; Chirkov, Yu. G. ;

REPT. NO. FSTC-HT-23-1566-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of unidentified Russian
nono., pub. by 'Nauka', Moscow, 1971 364p.

DESCRIPTORS: *Fuel cells, *Books, *Porous
materials, Catalysts, Capillarity, Gas flow,
Electrodes, Electrochemistry, Translations,
USSR

The book deals with macrokinetic processes in
porous media, particularly in porous catalysts of
fuel cells. It presents a detailed exposure of the
theory of porous gas-diffusion electrodes and
investigates capillary phenomena in porous media,
hydrodynamic mixing and related processes.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 781 114 9/5
POLYTECHNIC INST OF NEW YORK BROOKLYN

Generation of Ultra-High Power Electrical Pulses.

(U)

DESCRIPTIVE NOTE: Final rept. 1 Dec 72-30 Nov 73,
MAY 74 86P Birenbaum, L.; Levi, E. ;
CONTRACT: F30602-73-C-0053
PROJ: AF-4506
TASK: 450603
MONITOR: RADC TR-74-119

UNCLASSIFIED REPORT

DESCRIPTORS: *Pulse generators, *Radiofrequency generators, High power, Video signals, Microwave equipment, Generators, Radiofrequency power, Reviews, State of the art, Energy conversion, Superconductivity, Plasmas(Physics)

(U)

The report is a comprehensive assessment of the state-of-the-art of various energy conversion techniques involving high power electrical pulse generation. The subjects treated include rotating machines, explosive devices, superconductivity, switching, and plasma techniques, including the supercritical temperature and pressure regions.
(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 781 066 21/4 7/3

AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB OHIO

High Temperature Hydrocarbon Fuels Research in an Advanced Aircraft Fuel System Simulator on Fuel AFB-14-70.

(U)

DESCRIPTIVE NOTE: Final rept. Jul 70-Sep 72,
APR 74 140P Bradley, Royce P.; Bankhead, Richard; Bucher, Warren E. ;
REPT. NO. AFAPL-TR-73-95
PROJ: AF-3048
TASK: 304805

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Mar 70, AD-867 582.

DESCRIPTORS: *Kerosene, *Fuel systems, *Thermal stability, *Jet engine fuels, Aircraft equipment, Thermal stability, Manifolds(Engines), Deposits, Hydrocarbons, Flight simulators, Nozzles, Supersonic flight, Surfaces, Simulators, Heat exchangers, Oxygen, Solutions(Mixtures), Oxidation
IDENTIFIERS: Dissolved oxygen

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Hydrocarbon fuels tend to form deposits in the thermal environment associated with high mach number flight. The Advanced Aircraft Fuel System Simulator provides thermal stability data on fuels which are used to determine aircraft fuel system design criteria, operational limits of fuels, and to aid in the development of small-scale thermal stability test devices. Fuel AFB-14-70, the seventh fuel in a series, was tested under cyclic and steady-state conditions. Steady-state manifold tests were run to determine the effect of dissolved oxygen on thermal stability. The results of tests using manifold tubes with widely different surface finishes are reported. (Modified author abstract)

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DCC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 781 021 10/2 20/9
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Thermodynamics of Liquid Metal MHD
Generators,

(U)

FEB 74 167P Kalafati, D. D. ; Kozlov, V.
B. ;
REPT. NO. FSTC-HT-23-1306-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of mono. Termodinamika
Zhirkometa Uicheskikh MGD-Preobrazovatelei,
Moscow, 1972 192p.

DESCRIPTORS: *Magnetohydrodynamic generators,
*Thermodynamics, *Electric power production,
Energy conversion, Efficiency,
Plasmas(Physics), Liquid metals, Vapor phases,
Translations, USSR

IDENTIFIERS: *Liquid metal MHD generators
(U)
(U)

The book is devoted to the thermodynamics of the
magnetohydrodynamic method of conversion of thermal
energy into electrical, using liquid metal working
fluids. The prospects for use of liquid metal MHD
converters in transportation and stationary power
engineering, based on nuclear sources, are set forth.
Possible thermodynamic cycles, the fields of their
use and the basic features of the heat circuits are
discussed. A thermodynamic analysis of possible
liquid metal MHD converter cycles is carried out,
methods of increasing their efficiency are pointed
out and analytical solutions are obtained for a
number of optimization problems. A section of the
book is devoted to prospects for use of the liquid
metal MHD converter built-on units to steam turbine
installations in a binary energy cycle for stationary
atomic electric power stations. (Modified author
abstract)

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DCC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 780 995 7/1
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Conversion of Liquid Hydrocarbons, (U)

MAY 74 5P Abidov, M. ; Goldfarb, B. Ya.
; Yanichkin, L. P. ; Sultanov, A. S. ;
REPT. NO. FSTC-HT-23-2451-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Patent (USSR) 282 573 p2
1970, by D. Trombley.

DESCRIPTORS: *Gas generating systems, *Hydrogen,
*Catalysts, *Hydrocarbons, Iron alloys, Nickel
alloys, Aluminum alloys, USSR, Translations,
Patents, Conversion, Water vapor, High
temperature (U)

The Russian patent refers to a method of
catalytic conversion of liquid hydrocarbons for
production of hydrogen in the presence of water
vapor. To reduce the carbon monoxide content it is
proposed that an aluminum - nickel - iron catalyst
with an oxidized surface be used. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 730 952 7/4 10/1
AMERICAN UNIV WASHINGTON D C

Research on Electrochemical Energy Conversion Systems. (U)

DESCRIPTIVE NOTE: Interim technical rept. no. 4, Apr-Oct 73,
 Robert T. ; Goodman, Richard M. ;
 CONTRACT: DAAK02-72-C-0084
 PROJ: DA-1-T-161102-A-34-A
 TASK: 1-T-161102-A-34-A-03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Interim technical rept. no. 3, AD-766 329.

DESCRIPTORS: *Fuel cells, Hydrates, Air, Propane, Sulfonic acids, Electrolytes, Fluorine compounds, Carboxylic acids, Solubility
 IDENTIFIERS: *Hydrocarbon air fuel cells, *Fuel cell electrolytes, Methanesulfonic acid/trifluoro, Butynix acid/heptatfluoro (U)

The research on electrochemical energy conversion systems has involved a search for electrolytes alternative to phosphoric acid for direct and indirect hydrocarbon fuel cells. It has concentrated on trifluoromethanesulfonic acid monohydrate and perfluorobutyric acid. Experiments in which hydrogen was electrooxidized showed that the enhanced performance of the sulfonic acid is not restricted to propane. Further, it is indicated that adsorption intermediates of the type seen in phosphoric acid and detrimental to the efficiency of the process are absent in this electrolyte. The electro oxidation of propane in perfluorobutyric acid proceeds at a lower rate than in CF3SO3H.H2. An apparatus and technique to measure the solubility of gases in electrolytes was installed. Preliminary measurements of the solubility of propane in CF3SO3H.H2O are in the same range as those reported for H3PO4. (Modified author abstract) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 779 877 10/1
NAVAL RESEARCH LAB WASHINGTON D C

Energy from the Ocean: An Appraisal. (U)

DESCRIPTIVE NOTE: Memorandum rept.,
 MAY 74 47P Griffen, Owen M. ;
 REPT. NO. NRL-MR-2803
 PROJ: NRL-F02-24, RR131-03
 TASK: RR131-02-41

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy, Oceans, Solar energy, Tides, Gradients, Heat, Wind, Power, Feasibility studies, Electric power plants (U)

The oceans and their environment have long been envisioned as renewable sources of energy. It is the purpose of this report to assess the feasibility of drawing on the sea for power and to determine the extent to which the oceans are likely to serve future energy needs. A review is made of proposed U.S. funding levels for the research and development of renewable energy sources during the years 1975 - 1979, and a study is made of the technical and environmental acceptability status of tidal, wind, and sea thermal power generation systems. The estimated costs of these environmental power sources are compared with the prevailing power costs for nuclear and coal plants. On the basis of these comparisons, recommendations are made for a program of research and development, culminating in the construction of prototype plants, for wind and sea thermal power plants. Tidal power generation is found to be technically feasible but economically uninviting at present. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 779 755 5/2

INFORMATICS INC ROCKVILLE MD

Selected Material from Soviet Technical Literature, December, 1973

FEB 74 177P Hibben, Stuart G. ;
 CONTRACT: F44620-72-C-0053, ARPA Order-1622-4
 MONITOR: AFOSR TR-74-0784

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-776 086.

DESCRIPTORS: *Scientific research, *USSR, Abstracts, Lasers, Explosion effects, Geology, Seismology, Particle beams, Particle accelerators, Electron beams, Materials, Solid state physics, Plasmas(Physics), Energy conversion

(U)

The report includes abstracts and bibliographic lists on contractual subjects which were completed in December, 1973. The major topics are: laser technology, effects of strong explosions, geosciences, particle beams, and material sciences. Sections on energy conversion and items of miscellaneous interest are included as optional topics. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 779 474 10/1 15/5

POWER APPLICATIONS INC VALLEY STREAM N Y

Design and Optimization of Electrochemical Device for Heating Military Rations.

(U)

DESCRIPTIVE NOTE: Final rept.

DEC 73 95P

CONTRACT: DAAG17-73-C-0250

PROJ: DA-1-T-762713-A-034

MONITOR: USA-NLABS TR-74-44-GP

UNCLASSIFIED REPORT

DESCRIPTORS: *Cooking devices, *Heating, *Military rations, Heat transfer, Electrochemistry, Water, Energy conversion, Sandwich construction, Anodes, Cathodes, Toxicity

(U)

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IDENTIFIERS: Design

An electrochemical heating element which is activated by immersion in water was evaluated as a means for heating military field rations. Heating elements measuring 155 sq. cm (24 square inches) and having a dry weight of approximately 30 grams were the basis of the experimental program. The basic heating element consisted of an anode-cathode electrolyte/separator sandwich-type thin structure which was connected with an internal current carrying network. Two electrochemical heating element formulations were investigated in detail, i.e., an air formulation which required access to atmospheric oxygen for efficient operation, and a non-air formulation which contained the oxidizing agent within the structure and operated efficiently in any ambient. (Modified author abstract)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 778 847 5/2

INFORMATICS INC ROCKVILLE MD

Information Support from Foreign Scientific Literature.

(U)

DESCRIPTIVE NOTE: Annual technical rept. 1 Jan-31 Dec 73.

MAR 74 9P Hibben, Stuart ;

CONTRACT: F44620-72-C-0053, ARPA Order-1622-4

MONITOR: AFOSR TR-74-0741

UNCLASSIFIED REPORT

DESCRIPTORS: *Scientific research, *USSR, Lasers, Explosion effects, Nuclear explosions, Geophysics, Seismology, Particle beams, Materials, Atmospheric physics, Energy conversion, Cybernetics, Bionics, Gravity

(U)

Under this contract Informatics Inc. has reported monthly all significant 1973 open-source publications on Soviet-bloc developments in the following fields: laser technology, effects of strong explosions, geosciences, particle beams, and material sciences. Optional topics, published irregularly, included the following: atmospheric physics, geomagnetic pulsations, energy conversion, biocybernetics, gravitational radiation, research vessels, and tunneling rockets.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 778 846 10/1

INFORMATICS INC ROCKVILLE MD

Solar Energy,

(U)

MAR 74 478P Stevovich, Vlastimir A. ;

CONTRACT: F44620-72-C-0053, ARPA Order-1622-4

MONITOR: AFOSR TR-74-0600

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar energy, Energy conversion, Power, Energy, Energy storage, Collection, Solar heating, Utilization, USSR, Power supplies, Reviews

(U)

The report is a comprehensive review of present major developments and future planning in various fields of applied solar engineering. The study covers theoretical and experimental data on the background and state-of-the-art of applied solar research in general, with emphasis on foreign work, particularly in the Soviet Union.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 778 094 6/1
 AIR FORCE CAMBRIDGE RESEARCH LABS 1 G HANSCOM FIELD
 MASS

Photosynthetic Energy Conversion: The
 Effect of Oxygen on the Light-Induced
 Proton Uptake Capability of Chloroplasts. (U)

DESCRIPTIVE NOTE: Physical sciences research papers,
 JAN 74 12P Quinlan, Kenneth P. ;
 REPT. NO. AFRL-74-0024, AFRL-PSRP-583
 PROJ: AF-8659
 TASK: 865906

UNCLASSIFIED REPORT

DESCRIPTORS: *Chloroplasts, *Photochemical
 reactions, *Oxygen, pH factor, Energy conversion,
 Photosynthesis, Protons (U)
 IDENTIFIERS: Spinach (U)

Oxygen is shown to enhance the light-induced proton
 uptake capability of spinach chloroplasts.
 Additional studies have also shown that oxygen is
 able to restore the light-induced pH rise of
 dithionite-treated chloroplasts. Similar results
 observed when oxygen is replaced by p-benzoquinone
 suggest that the effect of oxygen to enhance and
 restore the pH rise is related to its ability to
 pose the redox components of the electron transfer
 chain for maximum pH rise. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 777 737 10/2
 MICHIGAN UNIV ANN ARBOR DEPT OF MATERIALS AND
 METALLURGICAL ENGINEERING

Preliminary Reports, Memoranda and Technical
 Notes of the Materials Research Council
 Summer Conference Held at La Jolla,
 California, July, 1973. Volume II.
 Proceedings of the Discussion Group on Solar
 Energy Conversion, (U)

JUL 73 307P Hucke, Edward E. ;
 CONTRACT: DAHC15-71-C-0253, ARPA Order-2341

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-777 743.

DESCRIPTORS: *Energy conversion, *Solar energy,
 *Meetings, Photovoltaic effect, Energy, Thermal
 radiation, Gradients, Thermal power plants, Energy
 storage, Fuel cells, Hydrogen, Heat (U)

Discusses applications of solar energy,
 concentration and collection of solar energy,
 photovoltaic conversion, ocean thermal gradients,
 energy storage, and fuel cells. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 776 734 10/2

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Prospects and Scientific Problems of the
Application of Methods of Direct Electrical
Power Acquisition from Chemical Fuels,

(U)

MAR 74 28P Lidorenko, N. S. ; Muchnik,

G. F. ;

REPT. NO. FTD-MT-24-2-74

PROJ: FRD-T74-04-03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited machine trans. of Akademiya
Nauk SSSR. Izvestiya. Energetika i Transport, n2
p15-27 1973, by Michael L. Seidel.

DESCRIPTORS: *Fuel cells, Electric power production,
Costs, Reviews, Powers, Electrochemistry,
USSR, Translations

(U)

IDENTIFIERS: Electrochemical power generation

(U)

The fundamental prospects for the use of
electrochemical generators, which convert the
chemical energy of fuel into electrical energy are
examined. The optimal areas of their application in
comparison with other energy sources are determined.
Comparisons are conducted for a series of criteria,
including technical-economical. A survey is given
of the fundamental problems (theoretical,
experimental, technical) which appear in the
process of creating ECG.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 776 551 10/2

ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
VA

Heterogeneous Solar Converters Based on
Polycrystalline Cadmium Sulfide and Selenide,

(U)

NOV 73 11P Komashchenko, V. N. ;

Marchenko, A. I. ; Fedorus, G. A. ;

REPT. NO. FSTC-HT-23-1083-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Poluprovodnikovaya
Tekhnika i Mikroelektronika (USSR) n4 p112-121.

DESCRIPTORS: *Solar cells, *Semiconductor devices,
Cadmium sulfides, Cadmium selenides,
Manufacturing, Photoconductivity, Electrical
properties, Translations, USSR

(U)

Heterogeneous Solar Converters Based on
Polycrystalline Cadmium Sulfide and Selenide--
Translation.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 774 747 5/2

POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH
INSTProgress Report No. 38, 15 Sep 72-14 Sep
73, to the Joint Services Technical Advisory
Committee.NOV 73 429P Oliner, Arthur A. ;
REPT. NO. P18MRI-R-452.38-73
CONTRACT: F44620-69-C-0047
PROJ: AF-4751
MONITOR: AFOSR TR-73-1979

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Nov 72, AD-
753 710.

DESCRIPTORS: *Microwaves, *Scientific research,
Wave propagation, Waveguides, Microwave equipment,
Quantum electronics, Lasers, Optics.
Plasmas(Physics), Energy conversion, Solid
state physics, Communication and radio systems,
Control systems, Control theory, Computers,
Information theory

(U)

The report summarizes research accomplished under
the aegis of the Microwave Research Institute
and reflects the impact of the Joint Services
Electronics Program on the research activities of
faculty and students of the Institute. The
program covers a broad spectrum ranging from basic
theoretical physics, mathematics, and engineering, to
experimental investigations involving basic
measurements, development of devices, and materials.
The report is compiled under six headings:
Electromagnetics and Waveguide Techniques;
Quantum Electronics and Optics; Plasma
Physics and Energy Conversion; Solid State
and Materials; Communications and Computers;
Systems, Control, and Network Theory.
(Modified author abstract)

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AD- 772 719

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 772 719 '0/2

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Direct Transformation of Energy with the Help
of Fuel Elements and the Future of Their
Use in RR Transport.

(U)

DEC 73 22P Taft, V. A. ; Lieberman, F.
Ya. ;
REPT. NO. FTD-MT-24-10-74
PROJ: FTD-T74-04-03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Institut Inzhenerov
Zheleznodorozhnogo Transporta, Moscow. Trudy
(USSR) n261 p140-151 1968, by Charles T. Osterlag,
Jr.

DESCRIPTORS: *Fuel cells, Rail transportation,
Hydrazine, Alcohols, Hydrogen, Oxygen, Fuels,
USSR, Translations
IDENTIFIERS: Carbinols

(U)
(U)

Direct Transformation of Energy with the Help of
Fuel Elements and the Future of Their Use in RR
Transport--Translation.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 771 959 10/2

ENERGY RESEARCH CORP BETHEL CONN

High Powered Flame Heated Thermionic Power Source Module.

DESCRIPTIVE NOTE: Final rept. 1 Jun 71-1 Jun 73,

DEC 73 75P Engdahl, Richard E. ;

Engelberger, Joseph F. ; Baker, B. S. ;

CONTRACT: DAAB07-71-C-0222

PROJ: DA-1-T-762705-053

TASK: 1-T-762705-A-05301

MONITOR: ECOM 0222-F-71

UNCLASSIFIED REPORT

DESCRIPTORS: *Thermionic converters, Thermionic power generation, Modules (Electronics), Silicon carbides, Alumina, Chemicals, Vapor deposition, Electrons, Emitters, Tungstens, Diodes

IDENTIFIERS: *Thermionic diodes

(U)

(U)

Drawing upon technology acquired in the development of a 100 watt flame-heated thermionic diode, the contractor addressed the development effort toward a scale up to 1300 watts. The design concept called for a multiplicity of diodes serially connected in a single module. This was deemed necessary to minimize losses in power extraction and in power conditioning. Accomplishments included fabrication of SiC flame barriers in the size required and development of multiple layer refractory metal and insulation assembly techniques using chemical vapor deposition. (Modified author abstract)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 771 750 10/2 21/4

DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA

Energy conversion.

(U)

DESCRIPTIVE NOTE: Report bibliography Jan 54-Aug 73.

JAN 74 407P

REPT. NO. DDC-TAS-74-2

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *Bibliographies, *Energy management, *Energy, *Fuels, *Nuclear energy, *Solar energy, Ores (Nonmetallic), Shale, Petroleum products, Power supplies, Natural resources, Gases, Generators, Fuel cells, Policies, Energy storage, Anthracite, Thermionic generators, Imports, Mineral fuels, Management planning and control, Peat, Wind power, Electric power production, Department of Defense, United States Government, Bituminous coal, Natural gas

(U)

The bibliography is a compilation of 287 references on Energy Conversion. Citations are sequenced numerically within each of the following categories: (1) Fuel Cells; (2) Mineral Fuels; (3) Nuclear Energy; (4) Solar Energy; (5) Steam Power; (6) Thermionic Generators; (7) Thermoelectric Generators; (8) Geopolitical Energy Studies, and (9) Miscellaneous Studies. Corporate Author-Monitoring Agency, Subject, Title, Personal Author, Contract Number, and Report Number Indexes are included. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 771 581 10/2 21/5
SYSTEMS RESEARCH LABS INC DAYTON OHIO

Investigation in Energy Transfer and Energy
Conversion for Advanced Power and Propulsion
Systems.

(U)

DESCRIPTIVE NOTE: Final rept. 16 Mar 70-16 Mar 73,
OCT 73 120P Calvert, C.; Watson, J. ;
CONTRACT: F33615-70-C-1515
PROJ: AF-7116
MONITOR: ARL 73-0122

UNCLASSIFIED REPORT

DESCRIPTORS: *Gas turbines, *Energy conversion,
Short takeoff planes, Energy transfer,
Electrohydrodynamics, Diffusers, Nozzles

(U)

The report covers the work done in three areas of energy conversion and transfer involving fluid dynamic processes: electrofluiddynamic energy conversion, multicomponent flow research, and aerodynamic energy transfer research. The effort under item one was an exploration of direct energy conversion of fluid dynamic energy into electrical power using electrofluiddynamic (EFD) processes. The objective here was to identify workable and practical processes and designs for superior, lightweight, reliable, electrical generators. Item two covers studies of methods by which heat energy from reactions of solid particles or droplets contained in a combustion or reaction chamber can be used to produce fluid dynamic energy. The principal objective of this work was to assess wall erosion, particle suspension, and related fluid dynamic processes and components germane to practical thrust augmentation ejectors. The objective was to identify appropriate design concepts applicable to future vertical or short-field take-off-and-landing aircraft. (Modified author abstract)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 770 443 20/9 18/1
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Feasibility of MHD Conversion of Pulsed
Thermonuclear Reactor Energy,

(U)

NOV 73 15P Velikhov, E. P. ; Golubev, V.
S. ; Chernukha, V. V. ;
REPT. NO. FTD-HT-23-200-74
PROJ: FTD-74-01-43

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of Institut Atomnoi
Energii, Moscow. Rept. (USSR) p1-10, by Paul J.
Reiff.

DESCRIPTORS: *Magnetohydrodynamics, *Nuclear fusion,
Pulses, Energy, Efficiency, Translations,
USSR

(U)

The authors discuss the possibility of using certain conduction and induction MHD generators schemes for converting the energy of pulsed thermonuclear reactors (PIR), in which energy release occurs in a blanket which absorbs the basic fraction of hard radiation. The physical limitations on the achievable efficiency of conversion and the plasma parameters obtainable in the reactor (pressure about 1 kb, temperature about 2-3 eV), and the selection of working substance are explained. Sample parameters for a Faraday supersonic plasma MHD generator having solid electrodes (about 0.4 efficiency) and an induction piston MHD-generator (about 0.7 efficiency) which generate d.c. current and voltage are presented. (Modified author abstract)

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DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA
ENERGY CONVERSION. (U)
JUN 79

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 770 000 10/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
VA

Direct Energy Conversion Methods, (U)

JUL 73 31p Nesterov, B. P. ; Rydnik, V.
I. ;
REPT. NO. FSTC-HT-23-131-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Izvestiya Vysshikh
Uchebnykh Zavedenii. Fizika (USSR) n7 32p
1971.

DESCRIPTORS: *Energy conversion,
*Magnetohydrodynamic generators, *Thermionic power
generation, *Fuel cells, USSR, Translations (U)

Magnetohydrodynamic generators, thermo electric and
thermoion generators are discussed. Data are
presented for experimental installations of these
generators in the Soviet Union. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 766 969 18/5 10/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Self-Contained Low Power Atomic Plants, (U)

AUG 73 11p Petrosyants, A. M. ;
REPT. NO. FTD-HT-23-0702-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of mono. Ot
Nauchnogo Poiska k Stomnoi Promyshlennosti, n.p.,
1972 p198-203, by Paul J. Reiff.

DESCRIPTORS: (*NUCLEAR POWER PLANTS, USSR), FAST
REACTORS, THERMIONIC CONVERTERS, THERMOELECTRICITY,
GENERATORS, ELECTRIC POWER PRODUCTION, NUCLEAR REACTO
IDENTIFIERS: NUCLEAR THERMIONIC CONVERTERS, (U)
TRANSLATIONS (U)

The report discusses research in the USSR into
the direct conversion of thermal (nuclear) energy
into electrical, including thermionic,
thermo-electrical, and MHD methods. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 766 500 10/2 20/9

GENERAL ELECTRIC CO PHILADELPHIA PA SPACE DIV

Closed Cycle MHD for Central Station
Power with Fossil or Nuclear Fuels.

(U)

DESCRIPTIVE NOTE: Technical information series rept.,

AUG 73 47P Zauderer, Bert ; Marston,

Charles H. ; Cook, Charles S. ;

REPT. NO. 73SD231, ONR-TR-20

CONTRACT: N00014-73-C-0039

PROJ: AF-9800

UNCLASSIFIED REPORT

DESCRIPTORS: (*MAGNETOHYDRODYNAMIC GENERATORS, ENERGY
CONVERSION), (*ELECTRIC POWER PRODUCTION,
MAGNETOHYDRODYNAMIC GENERATORS), ALKALI METAL COMPOUNDS,
VAPORS, REACTOR FUELS, THERMAL PROPERTIES (U)
IDENTIFIERS: *CLOSED CYCLE MHD GENERATORS, FOSSIL
FUELS, ELECTROMAGNETS, SUPERCONDUCTORS, THERMAL
EFFICIENCY (U)

A closed cycle MHD generator using a noble gas with alkali metal vapor as the working fluid, when used as a topping unit for a conventional steam plant, can yield cycle efficiencies in excess of 60% at peak stagnation temperature of 3000F. While high enough for substantial gains in thermodynamic efficiency, this temperature is relatively low for an electrically conducting gas and conductivity is achieved by decoupling electron temperature from gas temperature. A ceramic regenerative heat exchanger supplies thermal energy to the working fluid. The latter can be any clean fossil fuel, preferably low BTU (about 150 BTU/SCF) coal gas. With multi-stage combustion, pulverized coal is also a possible fuel. On a long range basis, closed cycle MHD is ideally suited for high temperature gas cooled fission reactors and probably also to fusion reactors. The closed cycle MHD generator is adaptable to the Brayton cycle, the regenerative Brayton cycle and eventually the Rankine cycle. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 766 329 10/2

AMERICAN UNIV WASHINGTON D C

Research on Electrochemical Energy Conversion
Systems.

(U)

DESCRIPTIVE NOTE: Interim technical rept. no. 3, Oct 72-

Apr 73,

JUN 73 58P

Robert T. ; Grodman, Richard M. ;

CONTRACT: DAAK02-72-C-0084

PROJ: DA-1-T-061102-A-34-A

TASK: 1-T-061102-A-34-A-03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Feb 73, AD-758 180.

DESCRIPTORS: (*FUEL CELLS, *ELECTROLYTES), SILVER,
ELECTRODES, CORROSION, PHOSPHORIC ACIDS, HALOGENATED
HYDROCARBONS, FLUORINE COMPOUNDS (U)
IDENTIFIERS: ACETIC ACID/DICHLORO, HYDROCARBON AIR
FUEL CELLS (U)

The research on electrochemical energy conversion systems has involved work on two tasks: a search for electrolytes alternative to phosphoric acid for direct and indirect hydrocarbon-air fuel cells, and a study of the corrosion characteristics of electrolytes for intermediate-temperature hydrocarbon-air fuel cells. The work during this reporting period was concentrated on the first task.

Two alternative electrolytes, trifluoromethanesulfonic acid monohydrate and dichloroacetic acid, representative of two classes of compounds, were studied in some depth. The first compound shows definite promise as an alternative electrolyte. It is physically and electrochemically stable up to 135C for periods of time up to six weeks. The limiting current density for the oxidation of propane at 135C is approximately 15 times that observed in H3PO4 at the same temperature. Certain problems associated with the use of dichloroacetic acid were encountered. These were interpreted in terms of the state of the 'unbound' water in the electrolyte. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 765 933 20/9 10/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Magnetohydrodynamic Method of Obtaining
Electrical Energy (Collection of Articles),

(U)

APR 73 444P Kirillina, V. A.; Sheindlina,

A. E.;
REPT. NO. FTD-MT-24-1737-72

PROJ: AF-3144

TASK: 314426

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited machine trans. of mono.

Magnitogidro Dinamicheskiy Metod Polucheniya
Elektroenergii, Moscow, 1968 p7-76, 100-205, 265-307,
315-354, 373-391, by Robert D. Hill and Ray E.
Zarza.

DESCRIPTORS: (*MAGNETOHYDRODYNAMICS, ENERGY CONVERSION),
MAGNETOHYDRODYNAMIC GENERATORS, PLASMA MEDIUM,
ELECTRODES, ELECTRIC POWER PRODUCTION, REVIEWS, USSR (U)
IDENTIFIERS: OPEN CYCLE MHD GENERATORS, (U)
TRANSLATIONS

The report is a Russian translation which
discusses various techniques in magnetohydrodynamics
for energy conversion. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 765 783 10/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
VA

Solar and Wind Power to Be Harnessed
(Energiyu Solntsa i Vetra - v Upryazhu),

(U)

NOV 72 SP Shefter, Ya.; Aleksenko, G.;
Lidorenko, N.; Iosipyan, S.; Shakhov, A.;
REPT. NO. FSTC-HT-23-922-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. from Pravda, Moscow
(USSR) p3, 11 May 71.

DESCRIPTORS: (*ELECTRIC POWER PRODUCTION, ENERGY
CONVERSION), POWER PLANTS (ESTABLISHMENTS), SOLAR
RADIATION, WIND, USSR
IDENTIFIERS: TRANSLATIONS (U)
(U)

The state of wind and solar power installations is
briefly reviewed. Wind-driven plants of 1-15 KW,
the application of semiconductors for direct
conversion of solar energy to electricity, solar
distillation, refrigeration, and air conditioning are
considered. It is proposed to establish wind power
installations at altitudes of 7-9 km. above the
surface of the earth to take advantage of constant
winds and thus make it possible to obtain power at
any point on the globe. Various proposals are made
in the area of 'small' energetics. The problems
related to harnessing sun and wind power are
discussed. (Author, modified-PL) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 765 476 10/2
ARMY CONSTRUCTION ENGINEERING RESEARCH LAB CHAMPAIGN
ILL

Advanced Electrical Power Generation and
Distribution Concepts for Military
Facilities.

DESCRIPTIVE NOTE: Preliminary rept.

JUN 73 133P

REPT. NO. CERL-PR-E-13

PROJ: DA-4-A-062112-A-891

TASK: 4-A-062112-A-89102

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTRIC POWER PRODUCTION, MILITARY
REQUIREMENTS). PREDICTIONS, POWER
PLANTS(ESTABLISHMENTS). POWER EQUIPMENT, GENERATORS,
TRANSMISSION LINES, ABUNDANCE

(U)

The report describes probable technical advancement
of electrical power generation systems in the 1980-
1990 time period for application in fixed or semi-
fixed military facilities in the power range of 250
kw to 50,000 kw. Subjects covered include
commercial: power reliability, uninterruptible power
system, conventional steam, diesel, gas turbine
(open and closed cycle) generators and
distribution systems for currently available
equipment. Advanced power systems include nuclear
reactors, batteries and fuel cells,
magnetohydrodynamic systems, fusion systems, solar
power systems and direct conversion systems of the
thermoelectric and thermionic type. (Modified
author abstract)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 764 935 9/1
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Parameters of Magnetoacoustic Converters.

(U)

JUL 73 12P Surikova, E. I. ;

REPT. NO. FTD-HT-23-696-73

PROJ: FTD-T74-01-41, FTD-T74-01-40

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of Institut
Aviatsionnogo Priboroostroeniya, Leningrad. Trudy
(USSR) n45 p81-86 1965, by Victor Mesenzeff.

DESCRIPTORS: (*DELAY LINES, ELECTROACOUSTIC
TRANSDUCERS), ULTRASONIC RADIATION, ENERGY CONVERSION,
MAGNETIC FIELDS, DESIGN, USSR
IDENTIFIERS: MAGNETOACOUSTICS, ACOUSTIC DELAY LINES,
ACOUSTIC WAVES, SURFACE WAVES, SIGNAL PROCESSING,
SURFACE WAVES, TRANSLATIONS

(U)

(U)

The report discusses theoretical and experimental
studies concerning the effect of structural
parameters of a magnetoacoustical converter and its
position with respect to the acoustic line on the
magnitude and shape of the output signal.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 764 925

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FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Magnetohydrodynamic Generator for a Combined
Magnetohydrodynamic Electric Power Plant with
a First Generation Open Cycle.

(U)

JUL 73 27P Shumyatskiy, B. Ya. ;
Koryagina, M. G. ; Ivanov, P. P. ; Kovbasyuk, V. I. ;

REPT. NO. FTD-MT-24-713-73

PROJ: AF-3145

TASK: 314526

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited machine trans. of unidentified
Russian mono. pub. by Institut Vysokikh Temperatur,
n.p., Mar 73 p3-16, by Rene E. Courville.

DESCRIPTORS: (*ELECTRIC POWER PRODUCTION,
*MAGNETOHYDRODYNAMIC GENERATORS), ENERGY CONVERSION,
MAGNETIC FIELDS, HALL EFFECT, RELIABILITY(ELECTRONICS),
USSR (U)
(U)

IDENTIFIERS: TRANSLATIONS

Contents: Preliminary analysis of the best
magnetic systems: Variation problem in the
technical and economical optimization of an MHD
generator: Characteristics of optimum MHD
generators.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 764 357

10/2

AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB
OHIO

Lithium-Doped Silicon Solar Cells State-
of-the-Art.

(U)

DESCRIPTIVE NOTE: Technical rept. Apr-Oct 72,
JUN 73 42P Green, John M. ;
REPT. NO. AFAT-TR-73-4
PROJ: AF-3145
TASK: 314519

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, STATE-OF-THE-ART REVIEWS),
SILICON, LITHIUM, DOPING, ENERGY CONVERSION, DAMAGE,
RADIATION EFFECTS, INHIBITION, SPACECRAFT COMPONENTS,
SPACE ENVIRONMENTS (U)

The present status of lithium-doped solar cells was
investigated. Improvements in fabrication
techniques have made possible lithium-doped cells
which are 11.9% efficient at AMO conditions and
28 C. Cell areas of 12 square centimeters are
now feasible. Annealing characteristics are highly
temperature dependent with 60 C being the minimum
array temperature for good performance. If the
recovered power levels for N/P cells and P/N
lithium-doped cells are compared for an array
temperature of 80 C, it is found that the P/N
lithium-doped cells are 15% higher after 10 to the
15th power/sq cm 1 Mev equivalent electrons and
85% higher after 10 to the 13th power/sq cm fission
spectrum neutrons. Based on this survey the use of
lithium-doped cells is recommended for missions which
require solar arrays to operate at temperatures above
60 C, especially if the satellite must survive a
nuclear weapon environment. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 764 277 10/2

ATOMICS INTERNATIONAL CANOGA PARK CALIF

Portable Thermoelectric Generator. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 1, 1 May-31 Jul 62.

A. : AUG 62 26P Miller, N. C. ; Lockwood, R.

REPT. NO. AI-7642

CONTRACT: DA-44-009-eng-5000

UNCLASSIFIED REPORT

DESCRIPTORS: (*GENERATORS, THERMOELECTRICITY), PORTABLE EQUIPMENT, DESIGN, SEMICONDUCTORS, ENERGY CONVERSION, HEATERS, GASOLINE, THERMOCOUPLES, LEAD COMPOUNDS, TELLURIDES, TIN COMPOUNDS (U)

IDENTIFIERS: LEAD TELLURIDES, *THERMOELECTRIC POWER GENERATION, TIN TELLURIDES (U)

Progress is reported on a 150-w portable thermoelectric generator, employing a leaded gasoline burner as the heat source, and weighing no more than 30 lb, including fuel for 4-hr operation. A process was developed for forming rectangular hexahedral semiconductor thermoelectric elements from granular starting material, by hot pressing in graphite dies. The thermoelectric materials selected are commercially available PbTe with 0.055% PbI₂ (n elements) and PbSnTe (p elements). The gasoline burner and an aspiration system for the intake of both combustion and cooling air have been intensively analyzed. Critical nozzle experiments are under construction. The design of the energy conversion stage is substantially complete. (Modified author abstract) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 762 759 13/10

WESTINGHOUSE ELECTRIC CORP CHESWICK PA ELECTRO-MECHANICAL DIV

Design and Development of a Segmented Magnet Homopolar Torque Converter. (U)

DESCRIPTIVE NOTE: Semi-annual technical rept. no. 2, 1 Dec 72-31 May 73,

JUN 73 70P

Mole, C. J. ; Arcella, F.

G. ;

REPT. NO. EM-4518

CONTRACT: DAHC15-72-C-0229, ARPA-Order-2174

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Semi-annual technical rept. no. 2, AD-753 541.

DESCRIPTORS: (*MAGNETIC DRIVES, DESIGN), (*MARINE PROPULSION, *ENERGY CONVERSION), STEAM TURBINES, GAS TURBINES, ELECTROMECHANICAL CONVERTERS, MAGNETIC FIELDS, LIQUID METALS, ALKALI METALS, ELECTRIC MOTORS, SEALS (U)

IDENTIFIERS: MECHANICAL DRIVES, TORQUE CONVERTERS (U)

This program is for the research and development of a new mechanical power transmission concept: the segmented magnet homopolar torque converter. The purpose of this device is to convert unidirectional torque of constant speed (such as from a steam turbine prime mover) into variable speed output torque in either the forward or reverse directions. The report period encompasses the completion of Phase 1 study phase, and the initiation of Phase 2 experimental work. In Phase 1 the technical problems were reviewed, the machine concepts were studied, and a detailed technical plan was evolved for the entire program. In Phase 2, theoretical, engineering, and experimental tasks will be performed to develop a reliable current collection system which will be demonstrated in an actual segmented magnet homopolar machine, and a design layout evolved for a demonstration torque converter. (Modified author abstract) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 758 180 10/2

AMERICAN UNIV WASHINGTON D C

Research on Electrochemical Energy Conversion Systems. (U)

DESCRIPTIVE NOTE: Interim technical progress rept. no. 2.

Apr-Oct 72.

FEB 73

54P

Adams, Alane A. ;Foley,

Robert T. ;

CONTRACT: DAAK02-72-C-0084

PROJ: DA-1-T-061102-A-34-A

TASK: 1-T-061102-A-34-A-03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Jul 72, AD-750 152.

DESCRIPTORS: (*FUEL CELLS, *ELECTROLYTES), AIR, HYDROCARBONS, CORROSION, PROPANE, ADSORPTION, PHOSPHORIC ACIDS, TANTALUM (U)
IDENTIFIERS: ELECTROLYTES, FUSED SALTS, ELECTROLYTES, (U)
FUEL CELLS, *HYDROCARBON AIR FUEL CELLS (U)

The research on electrochemical energy conversion systems has involved work on two tasks: A search for electrolytes alternative to phosphoric acid for direct and indirect hydrocarbon-air fuel cells; and A study of the corrosion characteristics of electrolytes for intermediate-temperature hydrocarbon-air fuel cells. In the search for alternate electrolytes the techniques and equipment to evaluate the oxidation of propane were assembled and modified. Preliminary results were obtained which, in general, confirm previously reported results. These include the data on steady-state adsorption of propane from phosphoric acid and the extent of surface coverage as a function of time and potential. It is intended that these data will become a bench mark for future work with other alternative electrolytes. Corrosion tests of several alloys were performed at 150C and 175C in 85% phosphoric acid. Tantalum coated steel was essentially immune to corrosion and should be a desirable construction material for this type of service. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 757 087 10/2

ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE VA

Performance Reliability Calculation for a Modular Solar Thermoelectric Generator, (U)

JAN 73

8P

Malevskii, Yu. N. ;

REPT. NO. FSTC-HT-23-1434-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Geliotekhnika (USSR) n1 p16-29 1971.

DESCRIPTORS: (*GENERATORS, *THERMOELECTRICITY), SOLAR RADIATION, MODULES(ELECTRONICS), RELIABILITY, SEMICONDUCTOR DEVICES, USSR (U)
IDENTIFIERS: *THERMOELECTRIC POWER GENERATION, TRANSLATIONS (U)

Analysis is given of the overall reliability of a solar energy converter unit composed of thermoelectric modules, as a function of the reliability of individual photocells and component modules. Expressions are given to determine the reliability of various module circuit designs having the modules in series, parallel and combined connections. The usefulness of redundancy in these designs is noted. Suggestions are given concerning the selection of module circuit designs most suitable for given operational requirements. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 756 104 10/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
Investigation of the Thermodynamic Perfection
of Steam Turbine Power Plants Superimposed
Open Cycle MHD Generators.

FEB 73 52P
REPT. NO. FTD-MT-24-1714-72

(U)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited machine trans. of mono.
Metody Matematicheskogo Modelirovaniya i
Optimizatsii, Teplo Energeticheskikh Ustanovok,
Moscow, 1972 p106-131, by Charles T. Ostertag, Jr.

DESCRIPTORS: (*STEAM POWER PLANTS, MAGNETOHYDRODYNAMIC
GENERATORS), (*MAGNETOHYDRODYNAMIC GENERATORS,
OPTIMIZATION), STEAM TURBINES, MAGNETOHYDRODYNAMICS,
CHEMICAL REACTIONS, ENERGY CONVERSION, MATHEMATICAL
MODELS, DESIGN, USSR

IDENTIFIERS: TRANSLATIONS, COMPUTER AIDED DESIGN
(U)
(U)

The report deals with the problems of the
mathematical modelling and complex optimization of
heat and power plants of different types. Basic
attention is given to the investigation of methods of
constructing mathematical models of heat and power
assemblies. A method of the automatic construction
of mathematical models is suggested. A significant
portion of the report is given to the presentation of
computational approaches and methods. Algorithms
of the optimization of continuously and discretely
changing parameters are presented and problems of
accelerating their convergence are studied. An
analysis of the properties of initial and desired
information is given. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 755 222 21/4
STANFORD RESEARCH INST MENLO PARK CALIF

Support of Energy Program Planning.

(U)

DESCRIPTIVE NOTE: Final rept.,
SEP 72 256P Schmidt, Richard A. ;
REPT. NO. SRI-1878-1
CONTRACT: N00014-72-C-0445, ARPA Order-2195
PROJ: SRI-187C

UNCLASSIFIED REPORT

DESCRIPTORS: (*DEPARTMENT OF DEFENSE, *FUELS), (*ENERGY
MANAGEMENT, DEPARTMENT OF DEFENSE), MANAGEMENT PLANNING
AND CONTROL, SOURCES, ENERGY, NATURAL RESOURCES,
RECOVERY, ENERGY CONVERSION, PRODUCTION, TRANSPORTATION,
STORAGE, VULNERABILITY, FUEL CONSUMPTION, DISTRIBUTION,
PETROLEUM PRODUCTS, GASES, COAL, NUCLEAR ENERGY,
HYDROGEN, HEAT, MINING ENGINEERING, ELECTRIC POWER
PRODUCTION

(U)

IDENTIFIERS: LIQUEFIED NATURAL GAS, GASES, OIL SHALE,
BITUMENS, PETROCHEMISTRY, SHALE OIL, FOSSIL FUELS,
HEAT RECOVERY, UTILIZATION, CONSERVATION

(U)

Principal energy problem areas of importance to the
Department of Defense were identified and
possible approaches to advanced research projects
directed toward solutions of these problems were
suggested to provide partial source material in
support of ARPA's research program planning.

Topics regarding sources and application of energy,
energy transformation, storage, and distribution, and
energy utilization were included. For each topic,
information was organized according to statement of
the problem, state of the art, present activities and
organization, implications for the DoD, and
recommendations for further studies. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMD7

AD- 753 828 10/2 10/3

ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTE-VILLE
VAAutonomous Energetics: Energy Sources for
the Earth, Sea and Space (Avtonomnaya
Energetiya: Istochniki Toka dlya Zemli,
Morya, Kosmosa).

(U)

JUN 72 4P
REPT. NO. FSTC-HT-23-1088-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Khimiya i Zhizn (USSR)
n10 p34-36 1970.DESCRIPTORS: (*ENERGY CONVERSION, USSR), POWER
EQUIPMENT
IDENTIFIERS: TRANSLATIONS(U)
(U)

In February 1970, a general meeting of the Academy of Sciences of the USSR was held, devoted to the role of science in technical progress. In speaking of principal trends of development in modern science, the president of the Academy of Sciences, academician M. V. Keldysh mentioned the importance of work in the field of autonomous energetics. A member of the Academy of Sciences of the USSR, N. S. Lidorenko, told about the work that is going on in the development of physical and chemical energy sources. (Author)

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMD7

AD- 753 541 13/10

WESTINGHOUSE ELECTRIC CORP CHESWICK PA ELECTRO-MECHANICAL
DIVDesign and Development of a Segmented Magnet
Homopolar Torque Converter.

(U)

DESCRIPTIVE NOTE: Semi-annual technical rept.,
DEC 72 40P Mole, C. J. ; Arcella, F.
G. ; Berkey, E. ; Boes, D. J. ; Brenner, William
C. ;

REPT. NO. EM-4471

CONTRACT: DAHC15-72-C-0229, ARPA Order-2174

UNCLASSIFIED REPORT

DESCRIPTORS: (*MAGNETIC DRIVES, DESIGN), (*MARINE
PROPULSION, *ENERGY CONVERSION), STEAM TURBINES, GAS
TURBINES, TORQUE, ELECTROMECHANICAL CONVERTERS, MAGNETIC
FIELDS, LIQUID METALS, LIQUID METAL PUMPS, SEALS,
ELECTRIC MOTORS
IDENTIFIERS: MECHANICAL DRIVES

(U)
(U)

The report describes research and development of a new mechanical power transmission concept; the segmented magnet homopolar torque converter. The purpose of this device is to convert unidirectional torque of constant speed (such as from a steam turbine prime mover) into variable speed output torque in either the forward or reverse directions. The concept offers an efficient, lightweight low volume design with potential application over a wide range of speeds and power ratings in the range from hundreds to tens of thousands of horsepower. This machine concept can be applied to commercial and military advanced concept vehicles for both terrain and marine environments. The report pertains to the initial study phase of a proposed 45 month program to design and develop this machine. In this phase all of the technical problems are being reviewed, the machinery concepts and applications are being studied, and a detailed technical plan is being evolved for the entire program. (Author)

(U)

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DCC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 752 257 10/3 10/1
BATTLE COLUMBUS LABS OHIO

Development of Stress-Strain Models for
Energy-Storing Systems. (U)

AUG 72 125? McCallum, John ; Thomas,
Ralph E. ; Roeger, Earl A., Jr;
CONTRACT: F33615-69-C-1537
MONITOR: AFAPL TR-72-68

UNCLASSIFIED REPORT

DESCRIPTORS: (*STORAGE BATTERIES, *ACCELERATED TESTING),
(*ENERGY CONVERSION, THEORY), STRESSES,
STRAIN(MECHANICS), STORAGE, INTENSITY, ANALOG SYSTEMS(U)

The report is an attempt to arrive at a useful stress-strain model for batteries. The first objective is to formulate and justify the meaning of stress and strain and similar concepts related to the performance and aging of batteries. A second objective is to formulate mathematical relationships for various combinations of springs, dashpots, and their analogs. A third objective is to associate specific processes and components in a battery with one or more models growing out of results from Objectives 1 and 2. In attempting to reach the first objective it seemed necessary to consider the general meaning of stress, strain, force, displacement, strain-rate, and acceleration, for individual forms of energy. The report expands on the generalized meaning of stress and strain for six forms of energy: (1) mechanical energy, (2) surface energy, (3) volume expansion energy, (4) electrical energy, (5) thermal energy, and (6) chemical energy. (U)

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DCC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 750 152 10/2
AMERICAN UNIV WASHINGTON D C

Research on Electrochemical Energy Conversion
Systems. (U)

DESCRIPTIVE NOTE: Interim progress rept. no. 1, Oct 71-
Apr 72, JUL 72 27P Foley, Robert T. ; Adams,
Aigne A. ;
CONTRACT: DAAK02-72-C-0084
PROJ: DA-1-T-061102-A-34-A
TASK: 1-T-061102-A-34-A-03

UNCLASSIFIED REPORT

DESCRIPTORS: (*FUEL CELLS, *ELECTROLYTES), HYDROCARBONS,
AIR, CORROSION, PHOSPHORIC ACIDS, TANTALUM, PHOSPHATES,
SALTS (U)
IDENTIFIERS: *ELECTROLYTES, *FUSED SALTS,
ELECTROLYTES, FUEL CELLS, *HYDROCARBON AIR FUEL
CELLS (U)

The research concerns electrochemical energy conversion systems. The investigation of the corrosion characteristics of fuel-cell electrolytes considered materials of construction for use in phosphoric acid as well as electrolytes alternative to phosphoric acid. Tantalum coatings are being studied for use in phosphoric acid and polyphosphates are being considered as suitable electrolytes without the corrosivity of phosphoric acid. The use of organic electrolytes such as gamma-butyrolactone solutions of lithium perchlorate appears feasible on a qualitative basis from some preliminary experiments on the anodic oxidation of propane. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 747 512 10/2 13/6
 ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
 VA

Fuel Cells and Prospects for Their Use in
 Railroad Transportation,

(U)

JUL 72 75P Anisimov, V. M. ;
 REPT. NO. FSTC-HT-23-960-72
 PROJ: FSTC-T7023012301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of mono. Toplivnye Elementy
 i Perspektivy Primeneniya ikh na Zheleznodorozhnom
 Transporte, Moscow, 1971, by Marcelle R. Blau.

DESCRIPTORS: (*FUEL CELLS, RELIABILITY(ELECTRONICS)),
 (*RAILROADS, *POWER SUPPLIES); DESIGN, CONFIGURATION,
 CHEMICAL REACTIONS, ELECTRODES, ELECTROLYTIC CELLS,
 FEASIBILITY STUDIES, USSR
 IDENTIFIERS: TRANSLATIONS

(U)

(U)

The principles of the direct conversion of chemical
 energy into electrical energy are examined.
 Different types of fuel cells are described and
 existing power plants and power plants with fuel
 cells are compared. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 747 293 10/2
 ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
 VA

Contemporary Status of Studies on Direct
 Conversion of Solar Energy to Electrical
 Energy (Sovremennoe Sostoyanie Issledovaniy
 po Priyomu Preobrazovaniyu Solnechnoy
 Energii v Elektrocheskuyu),

(U)

JUL 72 10P Lidorenko, N. S. ;
 REPT. NO. FSTC-HT-23-1429-71
 PROJ: FSTC-T7023012301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Geliotekhnika (USSR) n6
 p3-9 1969, by Albert L. Peabody.

DESCRIPTORS: (*ENERGY CONVERSION, SOLAR RADIATION),
 ELECTRIC POWER PRODUCTION, SOLAR CELLS, PHOTOELECTRIC
 EFFECT, THERMOELECTRICITY, USSR
 IDENTIFIERS: TRANSLATIONS

(U)

(U)

Photoelectric, thermoelectric and thermoemission
 methods of direct conversion of solar energy into
 electric energy are studied. The article presents
 a review of modern methods of investigation.
 (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 732 339 9/5 10/2
 ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
 Power Conditioning and Control Module for
 Hydrazine-Air Battery, Type I, pp-
 6204()/U.

(U)

DESCRIPTIVE NOTE: Research and development technical
 rept..
 JUN 71 19P Cannon, Melvin E. ;
 REPT. NO. ECOM-3435
 PROJ: DA-1-T-662705-A-053
 TASK: 1-T-662705-A-05305

UNCLASSIFIED REPORT

DESCRIPTORS: (*FUEL CELLS, *DC TO DC CONVERTERS),
 DESIGN, RELIABILITY(ELECTRONICS), CIRCUITS
 IDENTIFIERS: *HYDRAZINE AIR FUEL CELLS

(U)
 (U)

Military manpack type air battery power sources are presently under development by the US Army Electronics Command. These lightweight, silent, static power sources are needed to operate solid state communication and surveillance equipment and to recharge sealed and vented combat area type nickel-cadmium secondary batteries. The hydrazine-air battery, Type I, pp-6204()/U is a 60 watt system which utilizes two 21 cell stacks in parallel as the raw source of electrical power. A power conditioning and control system reflecting established components, circuits and techniques was applied to a prototype design of the 60 watt hydrazine-air power source. The functional aspects of the power conditioning system were based on a general purpose power source application which imposes the widest range of constraints. The availability of practical power conditioning technology for this much needed power source has been demonstrated. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 726 193 6/16
 DAYTON UNIV OHIO RESEARCH INST

An Irreversible Thermodynamic Analysis of the
 Energy Conversion Process in an Active
 Muscle.

(U)

DESCRIPTIVE NOTE: Final technical rept. Apr 69-Apr 71,
 APR 71 67P Boehman, Louis I. ;Minardi,
 John E. ;
 REPT. NO. UDRI-TR-71-09
 CONTRACT: N00014-69-A-0190-0001
 PROJ: NR-108-858

UNCLASSIFIED REPORT

DESCRIPTORS: (*MUSCLES, *ENERGY CONVERSION), PHYSIOLOGY,
 CONTRACTION, THERMODYNAMICS, ANALYSIS, ERGOMETERS,
 IRREVERSIBLE PROCESSES

(U)

A theory of muscle contraction was developed by the application of irreversible thermodynamics to the analysis of the energy conversion process in active muscle. Individual cross-bridges, considered as subunits, are viewed as linear energy converters with constant transport coefficients. With this view of the subunits, nonlinear phenomenological equations applicable to the whole muscle in steady-state operation were obtained. The transport coefficients for the whole muscle were shown to be a function of a single parameter, n , the number of activated cross-bridges at any instant. The theory was extended to include length variations derived from the sliding filament theory and both the chemical rate and velocity are derived as functions of length and load. Alternately, the chemical rate and mechanical load are derived as functions of length and velocity. The theory was compared to mechanical data with excellent results, to heat data (via the first law) with fair results, and to chemical data (by integrating with respect to length) with good results. The variation of n with velocity was determined by two methods: the first was based on experimental evidence in the form of Hill's force-velocity relation, the second was based on a molecular approach. The effect of Ca^{++} on n was determined by considering the Ca^{++} -troponin system to be a system in chemical equilibrium.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 724 109 10/2

ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

Characterization of Thermoelectric Converters
for Use in Hydrocarbon Fueled Power
Generators.

(U)

DESCRIPTIVE NOTE: Research and development technical
rept.,

APR 71 31P

Guazzoni, Guido E. ;

REPT. NO. ECOM-3412

PROJ: DA-1-T-662705-A-053

TASK: 1-T-662705-A-05301

UNCLASSIFIED REPORT

DESCRIPTORS: (*GENERATORS, THERMOELECTRICITY), SEEBECK
EFFECT, THERMOCOUPLES, GENERATORS), PELTIER EFFECT, SEEBECK
EFFECT, MATHEMATICAL ANALYSIS, PERFORMANCE(ENGINEERING(U)
IDENTIFIERS: *THERMOELECTRIC POWER GENERATION,
*THERMOELECTRIC CONVERTERS, THERMOPILES (U)

A method is presented to characterize the performance capability of flame heated thermoelectric converters, relating output power, long term operation, and inherent degrading factors. Experimental verification of the method is shown through data obtained on two thermopiles from 500 watt thermoelectric generators (PP-6075()) (U). Performance parameter characterization of the two thermopiles is reported. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 716 834 20/9 10/2

AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

Electrofluid Dynamic Energy Conversion.
Present Status and Research Areas,

(U)

JUL 70 22P Lawson, Maurice ; von Chain,

Hans J. P. ;

REPT. NO. ARL-70-0301V

PROJ: AF-7116

UNCLASSIFIED REPORT

Availability: Pub. in Transaction of the ASME Jnl.
of Engineering for Industry, Paper No. 70-Ener-
A, p1-20 1970.DESCRIPTORS: (*MAGNETOHYDRODYNAMICS, *ENERGY
CONVERSION), (*ELECTROSTATIC GENERATORS, ELECTRIC POWER
PRODUCTION), AUXILIARY POWER PLANTS, ELECTRICAL
CONDUCTIVITY, IONIZATION, BOUNDARY LAYER, REPORTS
IDENTIFIERS: *ELECTROHYDRODYNAMICS,
ELECTROHYDRODYNAMIC GENERATORS (U)

The paper presents in depth the major basic performance characteristics of electrofluid dynamic (EFD) energy conversion processes, which are shown to be complementary to magnetofluid dynamic processes. With a view toward making possible effective thermoelectric energy conversion without moving parts, the potential compatibility of incorporating low pressure ratio EFD processes into high pressure ratio thermodynamic cycles is shown. Investigations of scaling, similarity, performance characteristics, and the effects of physical properties of working media containing electric charges of one polarity are used as a basis to determine the major problems and corresponding research areas in EFD energy conversion. In general these are: Generation of Charged Colloids; Electrode and Conversion Duct Geometry; and Fluid Dynamic Energy Transfer Phenomena in Multicomponent, Multiphase Flows. Also given are typical configurations of EFD energy converters, and a look at potential applications, especially those associated with encapsulated, long-duration power supply for operations in space, under the ocean, or at remote unattended sites. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 704 164

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FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

FUEL ELEMENTS. KINETICS OF ELECTRODE PROCESSES
(COLLECTION OF ARTICLES). (U)

FEB 70 472? Chizmadzhev, Yu. A. ; Chirkov,
Yu. G. ; Markin, V. S. ; Fedotov, N. A. ;
Gurevich, I. G. ;

REPT. NO. FTD-MT-24-378-69
PROJ: FTD-6040102

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited machine trans. of mono.
Toplivnye Elementy. Kinetika Elektrodnykh
Protsessov, Moscow, 1968 p1-375, by Edwin P.
Pentecost.

DESCRIPTORS: (*FUEL CELLS, HANDBOOKS), (*ELECTRODES,
FUEL CELLS), REPORTS, GASES, POROUS MATERIALS, LIQUIDS,
METALS, ORGANIC COMPOUNDS, HYDRAZINE, HYDROGEN, (U)
CATALYSIS, REDUCTION(CHEMISTRY), USSR
IDENTIFIERS: LIQUID ELECTRODES, GAS ELECTRODES, (U)
TRANSLATIONS

The collection contains survey articles on the theory of work of fuel elements allowing direct conversion of chemical energy of fuel into electrical. Methods of macroscopic description of porous electrodes are considered taking into account a large number of transport and kinetic stages, model systems, capillary phenomena, kinetics of electrochemical conversions on smooth electrodes. Attention is allotted to the kinetics and mechanism of electroreduction of oxygen on metals-catalysts (metals of the platinum group, silver, nickel and on silver-nickel alloys) widely used in electrochemical generators. The mechanism of oxidation in fuel elements of such forms of fuel as methane, methanol, formic acid and hydrazine is described. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

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ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH (ENGLAND)

ONE-DIMENSIONAL FLOWS IN ELECTROGASDYNAMICS
(Odnomerniya Tsecheniya v Elektrogazodinamike), (U)

JUL 69 15P Bortnikov, Yu. S. ; Rubashov,

I. B. ;

REPT. NO. RAE Library Trans-1391

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Akademiya Nauk SSSR.
Izvestiya. Mekhanika Zhidkosti i Gaza, n6 p20-25
1968, by J. W. Palmer.

DESCRIPTORS: (*ONE DIMENSIONAL FLOW, *ELECTRIC
CURRENTS), (*ENERGY CONVERSION, GAS FLOW), TRANSONIC
CHARACTERISTICS, EFFICIENCY, USSR (U)
IDENTIFIERS: TRANSLATIONS, *ELECTROHYDRODYNAMICS (U)

One- dimensional electrogasdynamic flow is examined and conditions are formulated for the transition through the speed of sound. The concept of the effectiveness of the electrogasdynamic energy conversion process is introduced and an analytic expression is given for the efficiency. A comparison is made between the theoretical results and those obtained from experiments. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 700 447 10/1 9/3

NORTHWESTERN UNIV EVANSTON ILL GAS DYNAMICS LAB
ENERGY, (U)

NOV 67 181P Holmes, Lawrence B. ;

UNCLASSIFIED REPORT

Availability: Paper copy available from Northwestern
University Press, Evanston, Ill. 60201.
\$12.00.

SUPPLEMENTARY NOTE: Proceedings of the Biennial Gas
Dynamics Symposium (7th), Evanston, Ill., 23-25
Aug 67.

DESCRIPTORS: (*ENERGY CONVERSION, *SYMPOSIA), (*POWER
SUPPLIES, DESIGN), (*ENERGY MANAGEMENT, SYMPOSIA),
INDUSTRIES, HUMAN FACTORS ENGINEERING, NUCLEAR ENERGY,
MATHEMATICAL MODELS, TRANSPORTATION, SPACECRAFT,
MILITARY REQUIREMENTS, DEEP SUBMERGENCE, MECHANICAL
ORGANS, SOLAR PANELS (U)
IDENTIFIERS: GAS DYNAMICS, TECHNOLOGY TRANSFER (U)

Contents: Energy and economy; Contradictions
in energy resource estimates; Energy's
environmental factors; Universities and the needs
of the energy industries; Future needs of the
energy industries; Future use of nuclear energy in
the power industry; Models of all-gas and all-
electric economies; Energy sources and devices for
the transportation industry; Energy in space--
program planning for space power system technology;
Recent progress in military energy conversion;
Power for deep-ocean systems; Progress and
prospects for bio-energetics; Technology
utilization--the spinoff from aerospace technology to
the civilian sector. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 700 180 10/2 21/3

DEUTSCHE VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT E V
STUTTGART (WEST GERMANY)

INSTITUT FUER ENERGIEWANDLUNG UND ELEKTRISCHE
ANTRIEBE (Institute for Energy Conversion and
Electrical Propulsion). (U)

68 15P Knoernschild, Eugen M. ;
Peschka, Walter ;

UNCLASSIFIED REPORT

Availability: Pub. in Jahresbericht 1968 Deutschen
Versuchsanstalt fuer Luft- und Raumfahrt e.v., p1-
14 1968. No copies furnished.

SUPPLEMENTARY NOTE: Text in German.

DESCRIPTORS: (*ENERGY CONVERSION, REVIEWS), (*ELECTRIC
PROPULSION, REVIEWS), MAGNETOHYDRODYNAMIC GENERATORS,
THERMIONIC CONVERTERS, WEST GERMANY (U)

Reprint: Institute for energy conversion and electrical
propulsion.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 699 430 10/2
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

STATIC, SILENT, THERMOELECTRIC POWER SOURCES:
SESSION ON THERMAL ENERGY CONVERSION, (U)

69 4P Angello, Joseph P. ;

UNCLASSIFIED REPORT

Availability: Pub. in Annual Proceedings
(23rd), Power Sources Conference 4p. 20-22 May
69.

DESCRIPTORS: (*GENERATORS, THERMOELECTRICITY), POWER
SUPPLIES, NOISE, AUXILIARY POWER PLANTS, BATTERY
CHARGERS, CONTROL SYSTEMS, MILITARY REQUIREMENTS (U)
IDENTIFIERS: *THERMOELECTRIC POWER GENERATION (U)

The 10 and 20 ampere units were developed and proved to be fully feasible for Army field operation. The units have multifuel capability and run on liquid hydrocarbon fuels, such as combat gasoline, diesel, CITE and jet fuels, or mixtures thereof without any appreciable difference in performance. Consideration was given to design aspects necessary to reflect specified performance when exposed to service conditions of temperature (-25F to +125F), barometric pressure, humidity, vibration, submersion in water, bounce and shock. (Author) (U)

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 696 497 10/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

PHYSICAL AND TECHNICAL PROBLEMS OF DIRECT CONVERSION
OF CHEMICAL ENERGY INTO ELECTRICAL, (U)

APR 69 22P Lidorenko, N. S. ; Dmitrenko,
V. E. ; Yuppets, F. R. ; Muchnik, G. F. ;
Zaidenman, I. A. ;

REPT. NO. FTD-MT-24-39-69

PROJ: FTD-6040102

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited machine trans. of Akademiya
Nauk SSSR. Izvestiya. Energetika i Transport, n4
p3-12 1968.

DESCRIPTORS: (*FUEL CELLS, ELECTRIC POWER PRODUCTION),
DESIGN, THEORY, ELECTROCHEMISTRY, ELECTRODES, (U)
ELECTROLYTES, OXYGEN, HYDROGEN, HYDRAZINE, USSR (U)
IDENTIFIERS: HYDRAZINE AIR FUEL CELLS, HYDROGEN OXYGEN
FUEL CELLS, TRANSLATIONS, ZINC AIR BATTERY CELLS (U)

An analysis is made of the basic power aspects of the problem of developing fuel cells. From a physical energy point of view the system of electrochemical generators (ECG) is examined on the basis of an analysis of three components-the ECG itself and the systems of accessories and automatic adjustment, the creation of which is combined with the solving of a number of specific problems. The most important of these problems are examined and the necessity of their overall solution is brought out. As an example of practical realization of these problems, data are cited for an electrochemical generator with polymeric hydrophobic electrodes. This generator has promise for application in ground transport equipment. An analysis is made of the technology of manufacture of electrodes, design of battery, and volt-ampere characteristics. Photographs are shown of a Soviet ECG with ion-exchange membranes and cermet electrodes. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 696 428 10/3 10/2 10/1

ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

POWER SOURCES CONFERENCE (23rd ANNUAL), HELD
20-21-22 MAY 1969. PROCEEDINGS.

(U)

69 188P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publications Committee, Red Bank, N. J. 07701.
\$15.00.SUPPLEMENTARY NOTE: See also Annual rept. no. 22, AD-
696 427.

DESCRIPTORS: (*POWER SUPPLIES, SYMPOSIA), (*FUEL CELLS,
SYMPOSIA), (*ENERGY CONVERSION, POWER SUPPLIES),
(*PRIMARY BATTERIES, SYMPOSIA), (*STORAGE BATTERIES,
SYMPOSIA), (*FUZES(ORDNANCE), POWER SUPPLIES), BATTERY
COMPONENTS, ELECTRIC BATTERIES, INVERTERS, CONTROL
SYSTEMS, ZINC, AIR, THERMOELECTRICITY, GENERATORS (U)
IDENTIFIERS: METAL AIR BATTERIES, THERMOELECTRIC POWER,
GENERATION (U)

Topics included are: Fuel cells; Power
processing; Primary batteries; Zinc-air
batteries; Secondary batteries; Fuze power
sources; Thermal energy conversion.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 696 426 10/3 10/2 10/1

ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

POWER SOURCES CONFERENCE (21st ANNUAL), HELD
16-17-18 MAY 1967. PROCEEDINGS.

(U)

67 159P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publications Committee, Red Bank, N. J. 07701.
\$15.00.SUPPLEMENTARY NOTE: See also Annual rept. no. 20, AD-
696 425 and Annual rept. no. 22, AD-696 427.

DESCRIPTORS: (*POWER SUPPLIES, SYMPOSIA), (*FUEL CELLS,
SYMPOSIA), (*PRIMARY BATTERIES, SYMPOSIA), (*STORAGE
BATTERIES, SYMPOSIA), (*ENERGY CONVERSION, POWER
SUPPLIES), BATTERY COMPONENTS, ELECTRIC BATTERIES,
ELECTRODES, ALKALINE BATTERIES, GENERATORS, INVERTERS,
THERMOELECTRICITY, THERMIONIC CONVERTERS, BATTERY
CHARGERS, SURFACE PROPULSION (U)
IDENTIFIERS: *METAL AIR BATTERIES, *THERMOELECTRIC
POWER GENERATION (U)

Topics included are: Fuel cell electrodes;
Fuel cell systems; Vehicle propulsion batteries;
Secondary batteries; Power technology; Primary
batteries; Hydrocarbon fired thermal energy
conversion.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 696 425 10/3 10/2 10/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

POWER SOURCES CONFERENCE (20th ANNUAL), HELD
24-25-26 MAY 1966. PROCEEDINGS.

(U)

66 260P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publication Committee, Red Bank, N. J. 07701.
\$15.00.

SUPPLEMENTARY NOTE: See also Annual rept. no. 19, AD-
696 424 and Annual rept. no. 21, AD-696 426.

DESCRIPTORS: (*POWER SUPPLIES, SYMPOSIA), (*FUEL CELLS,
SYMPOSIA), (*STORAGE BATTERIES, SYMPOSIA), (*PRIMARY
BATTERIES, SYMPOSIA), (*ENERGY CONVERSION, POWER
SUPPLIES), (*SOLAR CELLS, SYMPOSIA), BATTERY COMPONENTS,
ELECTRIC BATTERIES, ELECTRODES, GAS GENERATING SYSTEMS,
ALKALINE BATTERIES, HYDROGEN, VOLTAGE REGULATORS,
THERMOELECTRICITY, GENERATORS, THERMIONIC CONVERTERS,
SILICON, INVERTERS

(U)

IDENTIFIERS: *METAL AIR BATTERIES, *NICKEL CADMIUM
BATTERIES, *THERMOELECTRIC POWER GENERATION

(U)

Topics included are: Fuel cell battery systems;
High energy density battery systems; Secondary
batteries; Thermal and solar energy conversion;
Power conditioning.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 696 424 10/3 10/2 10/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

POWER SOURCES CONFERENCE (19th ANNUAL), HELD
18-20 MAY 1965. PROCEEDINGS.

(U)

65 199P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publication Committee, Red Bank, N. J. 07701.
\$10.00.

SUPPLEMENTARY NOTE: See also Annual rept. no. 18, AD-
696 423 and Annual rept. no. 20, AD-696 425.

DESCRIPTORS: (*POWER SUPPLIES, SYMPOSIA), (*FUEL CELLS,
SYMPOSIA), (*STORAGE BATTERIES, SYMPOSIA), (*PRIMARY
BATTERIES, SYMPOSIA), (*ENERGY CONVERSION, POWER
SUPPLIES), (*SOLAR CELLS, SYMPOSIA), ELECTRODES, BATTERY
COMPONENTS, ELECTRIC BATTERIES, ALKALINE BATTERIES,
INVERTERS, BATTERY CHARGERS, DC TO DC CONVERTERS,
THERMIONIC CONVERTERS, PHOTOELECTRIC
CELLS(SEMICONDUCTOR), THERMOELECTRICITY, GENERATORS,
SEMICONDUCTOR DEVICES

(U)

IDENTIFIERS: *THERMOELECTRIC POWER GENERATION

(U)

Topics included are: Fuel cell batteries;
Secondary batteries; New battery systems; Power
conditioning; Thermal energy conversion; Tpy and
solar energy conversion.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 696 423 10/3 10/2 10/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N JPOWER SOURCES CONFERENCE (18th ANNUAL), HELD
19-21 MAY 1964. PROCEEDINGS. (U)

64 135P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publication Committee, Red Bank, N. J. 07701.
\$10.00.SUPPLEMENTARY NOTE: See also Annual rept. no. 17, AD-
696 422 and Annual rept. no. 19, AD-696 424.

DESCRIPTORS: (*POWER SUPPLIES, SYMPOSIA), (*FUEL CELLS, SYMPOSIA), (*STORAGE BATTERIES, SYMPOSIA), (*PRIMARY BATTERIES, SYMPOSIA), (*ENERGY CONVERSION, POWER SUPPLIES), (*SOLAR CELLS, SYMPOSIA), GAS GENERATING SYSTEMS, HYDROGEN, ELECTRODES, BATTERY COMPONENTS, ELECTRIC BATTERIES, ALKALINE BATTERIES, DC TO AC CONVERTERS, INVERTERS, GENERATORS, THERMOELECTRICITY, THERMIONIC CONVERTERS, GUIDED MISSILE BATTERIES, DAMAGE, RADIATION EFFECTS, VOLTAGE REGULATORS, BATTERY CHARGERS, PHOTOELECTRIC CELLS(SEMICONDUCTOR) (U)
IDENTIFIERS: NICKEL CADMIUM BATTERIES, SILVER CADMIUM CELLS, SILVER ZINC BATTERY CELLS, THERMOELECTRIC POWER GENERATION (U)

Topics included are: Fuel cell batteries;
Secondary batteries; Primary batteries;
Electrical to Electrical energy conversion;
Thermal energy conversion; Solar energy
conversion. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 696 422 10/3 10/2 10/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N JPOWER SOURCES CONFERENCE (17th ANNUAL), HELD
21-23 MAY 1963. PROCEEDINGS. (U)

63 195P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publication Committee, Red Bank, N. J. 07701.
\$10.00.SUPPLEMENTARY NOTE: See also Annual rept. no. 16, AD-
696 421 and Annual rept. no. 18, AD-696 423.

DESCRIPTORS: (*POWER SUPPLIES, *SYMPOSIA), (*SOLAR CELLS, SYMPOSIA), (*ENERGY CONVERSION, POWER SUPPLIES), (*FUEL CELLS, SYMPOSIA), (*STORAGE BATTERIES, SYMPOSIA), (*PRIMARY BATTERIES, SYMPOSIA), SILICON, DAMAGE, RADIATION EFFECTS, GENERATORS, THERMOELECTRICITY, THERMIONIC CONVERTERS, ELECTRODES, BATTERY COMPONENTS, ELECTRIC BATTERIES, ALKALINE BATTERIES, THERMOCOUPLES, DC TO DC CONVERTERS, INVERTERS, FREQUENCY CONVERTERS (U)
IDENTIFIERS: AMMONIA BATTERIES, NICKEL CADMIUM BATTERIES, SILVER ZINC BATTERY CELLS, SILVER CADMIUM CELLS, *THERMOELECTRIC POWER GENERATION (U)

Topics included are: Solar energy conversion;
Thermal energy conversion; Fuel cell batteries;
The future of fuel cells; Secondary batteries;
Primary batteries; Electrical conversion. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 696 421 10/3 10/2 10/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

POWER SOURCES CONFERENCE (16th ANNUAL). HELD
22-24 MAY 1962. PROCEEDINGS.

MAY 62 184P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publication Committee, Red Bank, N. J. 07701.
\$10.00.

SUPPLEMENTARY NOTE: See also Annual rept. no. 15, AD-
421 601, and Annual rept. no. 17, AD-696 422.

DESCRIPTORS: (*POWER SUPPLIES, *SYMPOSIA), (*FUEL CELLS,
SYMPOSIA), (*STORAGE BATTERIES, SYMPOSIA), (*PRIMARY
BATTERIES, SYMPOSIA), (*SOLAR CELLS, SYMPOSIA), (*ENERGY
CONVERSION, POWER SUPPLIES), MEMBRANES, ION EXCHANGE,
BATTERY COMPONENTS, ELECTRIC BATTERIES, ELECTRODES,
GENERATORS, THERMOELECTRICITY, THERMIONIC CONVERTERS,
RADIOACTIVE ISOTOPIES, ELECTRIC POWER PRODUCTION, NUCLEAR
REACTORS, AUXILIARY POWER PLANTS, SPACEBORNE, ALKALINE
BATTERIES, INVERTERS, DC TO DC CONVERTERS (U)
IDENTIFIERS: *NICKEL CADMIUM BATTERIES, *REGENERATIVE
FUEL CELLS, *SILVER CADMIUM CELLS, *SILVER ZINC
BATTERY CELLS, *THERMOELECTRIC POWER GENERATION (U)

Topic included are: Fuel cell materials and
mechanisms; Fuel cell batteries and systems;
Thermal energy conversion; Solar energy
conversion; Secondary batteries; Primary
batteries; Electrical to electrical energy
conversion. (U)

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AD- 693 361

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 683 361 10/1 10/2
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

SELECTED TOPICS IN ELECTROFLUID DYNAMIC ENERGY
CONVERSION. (U)

DEC 68 265P Lawson, Maurice ; Wattendorf,
Frank ;
MONITOR: AGARD OGRAPH-122

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: NATO furnished.

DESCRIPTORS: (*ENERGY CONVERSION,
*MAGNETOHYDRODYNAMICS), (*MAGNETOHYDRODYNAMIC
GENERATORS, SYMPOSIA), PLASMAS (PHYSICS), DENMARK,
FRANCE, SPACE CHARGE, ITALY, GREAT BRITAIN (U)

Contents: The role of electrofluid dynamics in
the field of direct energy conversion; Electrofluid
dynamic energy conversion processes characteristics
and research areas; Effects of electrode geometry
similarity and scaling laws in EFD energy
conversion processes; Working media for
electrofluid dynamic generators; Some analytical
treatments of EFD processes; Some remarks on
EFD energy conversion; Design and construction of
a 3-MW magnetogasdynamic power generation facility
at the University of Toronto Institute of
Aerospace Studies; Plasma research in
Denmark; Comments on electrofluid dynamics and
related research in France; The electrofluid
dynamic energy converter with space charge
neutralization; Comments on electrofluid dynamics
and related researches in Italy; Interest and
progress in electrofluid dynamics and related
researches in England. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 679 467 8/6 2/4 5/3
NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL
WASHINGTON D C FOREIGN FIELD RESEARCH PROGRAM
GEOGRAPHIC PATTERNS OF ENERGY CONSUMPTION IN
TASMANIA. (U)

DESCRIPTIVE NOTE: Final rept.,
OCT 68 181P Larson, Ronald A. ;
CONTRACT: N00014-67-A-0244
PROJ: NR-389-105

UNCLASSIFIED REPORT

DESCRIPTORS: (*NATURAL RESOURCES, ENERGY MANAGEMENT),
(*FUEL CONSUMPTION, AUSTRALIA), (*AUSTRALIA, ENERGY
MANAGEMENT), WOOD, COAL, POWER PLANTS(ESTABLISHMENTS),
FUEL OIL, AVIATION FUELS, COAL GAS, GASOLINE, ENERGY
CONVERSION, COMMERCE, STATISTICAL ANALYSIS (U)
IDENTIFIERS: ENERGY CONSUMPTION, IMPORTS (U)

Modern energy sources, one of the essentials for
productive economic activity, are being consumed in
ever increasing quantities to overcome the physical
resistances in production, transportation, and in the
conveniences of modern living. In this study, the
interplay of local and imported resources applied to
a range of economic activities is described in its
areal pattern in Tasmania. Attention is given
to: the mobilization of local resources of
firewood, hydroelectricity, and coal; the importation
of specialized petroleum and coal products; and the
energy processing activities of gas manufacture and
thermal power generation in the area. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 678 983 20/3 10/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB
PERFORMANCE CHARACTERISTICS OF THERMOMAGNETIC
DEVICES INVOLVING GRADED MASS AND GAP. I.
GENERATORS. (U)

DESCRIPTIVE NOTE: Journal article,
FEB 68 15P Honig,Jurgen M. ;Lax,
Benjamin ;
REPT. NO. JA-3048
CONTRACT: AF 19(628)-5167, F44620-67-C-0047
MONITOR: ESD,AFOSR TR-68-333,69-0436TR

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Applied Physics,
V39 n8 p3549-3562 Jul 68.
SUPPLEMENTARY NOTE: Revision of report dated 22 Jun
67.

DESCRIPTORS: (*MAGNETIC PROPERTIES, *THERMODYNAMICS),
(*ENERGY CONVERSION, MAGNETIC PROPERTIES), TRANSPORT
PROPERTIES, THEORY, EFFICIENCY, TEMPERATURE, MAGNETIC
MATERIALS, DENSITY (U)
IDENTIFIERS: *THERMOMAGNETIC EFFECTS (U)

The theory pertaining to operating characteristics
of thermomagnetic generators with graded mass and gap
has been developed using the fundamentals of
irreversible thermodynamics. On introducing
transport theory and a considerable number of
simplifying assumptions, analytic results were
obtained for the efficiency of such devices in terms
of the transport coefficients evaluated at the hot
junction temperature. The numerical results have
been compared to those obtained with materials of
constant bandgap and to calculations performed by the
method of averaged parameters. The advantages of
using a graded gap material for energy conversion are
pointed out. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 678 628 20/12 9/1
STANFORD UNIV CALIF MICROWAVE LAB

STUDIES OF MICROWAVE SHEAR WAVES IN SOLIDS, (U)

MAY 67 151P Hean, E. G. H. ;
REPT. NO. ML-154C
CONTRACT: AF 49(638)-1429
PROJ: AF-9768
TASK: 976802
MONITOR: AFOSR 68-2637

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLIDS, WAVE PROPAGATION), (*ENERGY CONVERSION, MICROWAVE FREQUENCY), STRESSES, ACOUSTICS, PIEZOELECTRIC CRYSTALS, TRANSDUCERS, THEORY, LITHIUM COMPOUNDS, NIOBATES, SCATTERING, EQUATIONS OF MOTION, DIFFRACTION, COHERENT RADIATION, INTERACTIONS, BIREFRINGENCE, TEST FACILITIES, THESESES (U)
IDENTIFIERS: BRAGG DIFFRACTION, SHEAR WAVES, TRANSVERSE WAVES (U)

Due to the slower velocities and the transverse wave nature, microwave shear waves have interesting theoretical properties and important practical application. Theoretical and experimental investigation of microwave shear waves in solids were conducted with emphasis on the efficient generation of microwave shear waves and on the theory and application of the parametric interaction of microwave shear waves and light. Efficient shear wave transducers make possible the study of the interaction of light and microwave shear waves in solids. In microwave frequencies, the interaction of light and microwave shear waves is in the Bragg diffraction region. We have used a laser as an optical probe to map the energy distribution of shear waves, to measure the attenuation, to estimate the mode conversion efficiency of a YAG mode converter, and to determine the reflection and transmission coefficients of shear wave bonds. We have also demonstrated the second feature of shear wave diffraction in measuring quantitatively the acoustic birefringence in a (110) oriented YAG rod. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 674 120 20/9 10/2
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA ATOMIC AND MOLECULAR SCIENCES

BASIC PLASMA PROCESSES. (U)

DESCRIPTIVE NOTE: Summary technical rept. 1 Jul 67-30 Jun 68, 68 43P Phelps, A. V. ; Chen, C. L.

REPT. NO. 68-9E5-GASES-R1
CONTRACT: Nonr-4725(00)
PROJ: NR-099-380

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-657 864.

DESCRIPTORS: (*PLASMAS(PHYSICS), *ENERGY CONVERSION), (*CESIUM, PLASMAS(PHYSICS)), RESONANCE, REFLECTION, VAPOR PRESSURE, SCATTERING, QUENCHING(INHIBITION), SAPPHIRE, INTERFACES, EXCITATION, LINE SPECTRA, IONIZATION, LIGHT TRANSMISSION, THERMIONIC CONVERTERS, MAGNETOHYDRODYNAMIC GENERATORS (U)

Measurements of the magnitude and wavelength dependence of the specular reflection of light in the vicinity of the cesium resonance lines from a cesium-sapphire interface verify the Taylor-Langmuir formula for the vapor pressure of cesium in the temperature range from 500 to 600K. This result eliminates the Cs density as a source of systematic error in our previous measurements of the self-broadening of the Cs resonance lines at 8521 and 8944A. Measurements have been made of the total amount of diffusely scattered resonance radiation for pure Cs and for Cs-nitrogen mixtures at Cs densities between 10 to the 14th power and 10 to the 16th power atom/cu cm. A preliminary analysis of this data shows that the method is capable of yielding quenching cross sections at high alkali vapor densities. Some features of the results, such as the apparent quenching caused by pure Cs, are not yet understood. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 671 685 10/3 10/2 10/1

AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB OHIO

PERFORMANCE FORECAST OF SELECTED STATIC ENERGY CONVERSION DEVICES. MEETING OF AGARD PROPULSION AND ENERGETICS PANEL 29TH, LIEGE, BELGIUM, JUNE 12-16 1967.

(U)

67 1158P Sherman, G. W.; DeVol, L.;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: NATO furnished.

DESCRIPTORS: (*ENERGY CONVERSION, SYMPOSIA), BATTERY COMPONENTS, ELECTRIC BATTERIES, FUEL CELLS, SOLAR CELLS, PHOTOELECTRIC CELLS (SEMICONDUCTOR), STATE-OF-THE-ART REVIEWS, PERFORMANCE (ENGINEERING), ELECTROCHEMISTRY, LEAD (METAL), ACIDS, NICKEL COMPOUNDS, OXIDES, CADMIUM, SILVER COMPOUNDS, ZINC, SILVER, NICKEL, AIR, HYDROGEN, OXYGEN, HYDRAZINE, HYDROCARBONS, CARBINOLS, MAGNESIUM, CHLORINE, SILICON, CADMIUM SULFIDES, CADMIUM COMPOUNDS, TELLURIDES, GERMANIUM
IDENTIFIERS: THIN FILMS (U)
(U)

The theme of the meeting on batteries, fuel cells, and solar cells was the importance and necessity of making accurate performance forecasts. The first paper invited for each section is a review of the history and state-of-the-art. Subsequent papers in each section cover various areas bearing on the development of improved performance. The last paper examines the prospects for batteries, fuel cells, and solar cells, along with other schemes of energy conversion from the users point of view.

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AD- 668 263 10/1 10/2 21/3

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

DIRECT CONVERSION OF VARIOUS FORMS OF ENERGY INTO ELECTRIC AND MECHANICAL POWER, (U)

JUL 67 270P Alekseev, G. N.;

REPT. NO. FTD-MT-64-355

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited machine trans. of mono. Neposredstvennoe Prevrashchenie Razlichnykh vidov Energii v Elektricheskuyu Mekhanicheskuyu, Moscow/ Leningrad, 1963 336p.

DESCRIPTORS: (*ENERGY CONVERSION, REVIEWS), POWER SUPPLIES, BATTERY COMPONENTS, ELECTRIC BATTERIES, FUEL CELLS, THERMOELECTRICITY, GENERATORS, THERMIONIC CONVERTERS, PLASMA GENERATORS, MAGNETOHYDRODYNAMIC GENERATORS, ELECTRIC PROPULSION, RADIOACTIVE ISOTOPES, ELECTRIC POWER PRODUCTION, NUCLEAR REACTORS, NUCLEAR PROPULSION, THERMONUCLEAR REACTIONS, SOLAR CELLS, SOLAR SAILS, USSR
IDENTIFIERS: PHOTON ROCKETS, RADIOISOTOPE GENERATORS, TRANSLATIONS (U)
(U)

Contents: Direct conversion of chemical energy to electrical energy (Theory of fuel cells, Fuel cells with solid fuel, Fuel cells with gaseous fuel, Combined (solid-gas) fuel cells, Fuel cells with liquid fuel, Oxidizing reducing cells, Possibilities of application of fuel cells); Direct transformation of thermal energy into electrical and mechanical energy (Thermoelectric generators, Vacuum thermionic emission electric generators, Gas-filled thermionic emission electric generators, Plasma thermionic emission electric generators, Certain general questions for thermionic electric generators, Information on magnetohydrodynamics, Magnetohydrodynamic electric generators, Electron rocket motors); Direct transformation of nuclear energy into electrical and mechanical energy (Radioisotope electric generators, Nuclear radioisotope motors, Nuclear reactor electric generators, Nuclear reactor motors, Thermionuclear electric generators, Thermionuclear motors); Direct transformation of solar energy into electrical and mechanical energy (Solar electric generators, Solar sail, (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 665 915 10/1 10/2
ADVISORY GROUP FOR AERONAUTICAL RESEARCH AND DEVELOPMENT
PARIS (FRANCE)

COMBUSTION AND PROPULSION, (U)

MAR 64 937P DeGroff, H. M.; Hoglund,
R. F.; Fabri, J.; Magey, T. F.; Rumbaugh, M.
E., Jr;
REPT. NO. AGARD-ograph-81

UNCLASSIFIED REPORT

Availability: Hard copy available from Gordon and
Breach Science Publishers, New York, N.
Y.

SUPPLEMENTARY NOTE: NATO Furnished. AGARD Colloquium on
Energy Sources and Energy Conversion (6th), held
at Cannes (France), 16-20 Mar 64.

DESCRIPTORS: (*ENERGY CONVERSION, SYMPOSIA), THERMIONIC
CONVERTERS, MAGNETOHYDRODYNAMIC GENERATORS,
THERMOELECTRICITY, ELECTRIC POWER PRODUCTION, FUEL
CELLS, THERMODYNAMICS, COMBUSTION, PROPULSION SYSTEMS (U)
IDENTIFIERS: PHOTOVOLTAIC EFFECT, THERMOELECTRIC POWER
GENERATION (U)

Contents: Dynamic energy conversion--energy
sources, heat transfer limitations, energy
converters; Direct energy conversion thermal
sources--energy sources, thermionic converters, MHD
and EFD converters, thermoelectric converters;
Direct energy conversion chemical sources; Direct
energy conversion radiant sources. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 665 484 10/1 7/5
NORTHEASTERN UNIV BOSTON MASS PHOTOCHEMISTRY AND
SPECTROSCOPY LAB

RESEARCH IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Final rept. 1 Oct 63-30 Sep 66,
SEP 67 675P
Karl Wiener, Robert N.;
CONTRACT: AF 19(628)-3836
PROJ: AF-8659
TASK: 865901
MONITOR: AFCL 67-0512

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, SCIENTIFIC RESEARCH),
(*PHOTOCHEMICAL REACTIONS, ENERGY CONVERSION),
(*THERMIONIC EMISSION, ENERGY CONVERSION),
(*PHOTOELECTRIC EFFECT, ENERGY CONVERSION), SILICON,
EPITAXIAL GROWTH, THERMIONIC CONVERTERS, PHOTOELECTRIC
CELLS (SEMICONDUCTOR), SOLAR CELLS, SEMICONDUCTORS,
SEMICONDUCTOR DIODES, POLYCYCLIC COMPOUNDS, KETONES,
SULFIDES, PHOTOLYSIS, NITROBENZENES, FREE RADICALS,
LASERS, ELECTRON PARAMAGNETIC RESONANCE, NITROGEN
COMPOUNDS, MOLECULAR SPECTROSCOPY
IDENTIFIERS: PHENANTHRENEQUINONES, PHOTOVOLTAIC
EFFECT, TRINITRO BENZENES (U)
(U)

The results of investigations dealing with a broad
spectrum of topics in energy conversion are
presented. The individual studies are:
Techniques for fabrication of large, thin silicon
single crystals; Cathodes for thermionic energy
conversion; Carnot-limitation on efficiency of
photovoltaic energy-converters; Transient
photoresponse of solar cells from reverse to zero
bias; Electric field effects on diffusion in
silicon; Heterojunction photovoltaic energy
converters; Apparatus for photochemical
investigations; The photochemistry of
perinaphthenone; The photochemistry of
phenanthrenequinone; The unsensitized and
sensitized photoreduction of disulfides; The
photochemistry of 1,3,5-trinitrobenzene; Studies of
charge transfer systems; Laser photochemistry;
Diphenylpicrylhydrazyl as a calibration standard in
electron spin resonance spectroscopy; Investigation
of nitrogen-sulfur systems. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 660 362 10/3

NAVAL ORDNANCE LAB CORONA CALIF

CHEMOELECTRIC ENERGY CONVERSION FOR NONAQUEOUS RESERVE BATTERIES. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 15, Jan-Mar 67,
OCT 67 23P Harris, W. S. ; Hofmann, M. ;

Miles, M. H. ;

REPT. NO. NOLC-738

MONITOR: IDEP 102.80.00.00-X7-02

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-642 291.

DESCRIPTORS: (*STORAGE BATTERIES, *ELECTROCHEMISTRY),
(*WET CELLS, ELECTROCHEMISTRY), BATTERY COMPONENTS,
ELECTRIC BATTERIES, ELECTRODES, AMMONIA,
SOLUTIONS(MIXTURES), FUEL CELLS, SOLUBILITY, SULFUR,
OXIDATION REDUCTION REACTIONS, CATALYSTS, CARBINOLS,
CATALYSIS (U)

IDENTIFIERS: ACIDITY, AMMONIUM IONS, ELECTROCHEMISTRY,
OXIDATION, HYDROGEN SULFIDE, METHYL ALCOHOL, REFERENCE
ELECTRODES, RESERVE BATTERIES, THIOCYANATE/AMMONIUM (U)

The effects of H₂S and NH₄(+) on the reduction of sulfur in NH₃ solutions were investigated and both were found to be beneficial. The effects of various cathode materials and acid strengths on the reduction of m-DNB were also investigated and sulfamide and cyanamide were found to favorably affect the reduction of m-DNB, while urea did not. Various electrode materials were tested in acid liquid ammonia to determine their value as catalysts for the electrochemical oxidation of carbonaceous fuels. Titanium and tantalum were found to offer wide potential ranges and good resistance to electrode corrosion. Methanol was tested in liquid NH₃-NH₄SCN for possible oxidation on various electrode surfaces, but no activity was observed in liquid ammonia solutions. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 658 902 10/1 9/1

PURDUE UNIV LAFAYETTE INC SCHOOL OF ELECTRICAL ENGINEERING

P-I-N THERMO-PHOTO-VOLTAIC DIODE, (U)

AUG 67 133P Schwartz, R. J. ; Kim, C.

W. ;

REPT. NO. TR-EE67-13

CONTRACT: N00014-67-A-0226

UNCLASSIFIED REPORT

DESCRIPTORS: (*PHOTOELECTRIC CELLS(SEMICONDUCTOR),
*ENERGY CONVERSION), PHOTODIODES, GERMANIUM,
MANUFACTURING, SEMICONDUCTOR DEVICES, MEASUREMENT,
EFFICIENCY (U)

A p-i-n photovoltaic structure is discussed and compared with a conventional p-n junction photovoltaic converter with respect to the efficiency of conversion. The structure consists of an intrinsic region facing the illumination source with interdigitated p and n regions located on the unilluminated surface. The purpose of using an intrinsic region is to obtain longer lifetimes and diffusion lengths. The heavily doped p and n regions result in larger recoverable voltages and higher open-circuit voltages under high intensity illumination. The use of an evaporation process, with suitable masks, allowed precise control of the dimensions of the interdigitated p-i-n structure and led to the formation of heavily doped junctions. Subsequently a low alloying temperature was used in order to maintain high lifetime in the intrinsic region. It was found that a device fabricated with use of Au-Sb-As for n-type doping, Al for p-type doping, and alloyed at 430C in a gas ambient yielded heavily doped junctions. The p-i-n structure has been analyzed as a two-dimensional boundary value problem under the assumptions of charge neutrality and quasineutrality. The analysis includes calculations of the carrier concentrations generated by photon absorption, the electric field which causes an internal voltage drop in the intrinsic region, and the current dependence of the junction voltage. The solutions are given in terms of elementary functions. The results are obtained in graphical form by means of a computer. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 658 111 10/3 5/2

NAVAL ORDANCE LAB CORONA CALIF

CHEMOELECTRIC ENERGY CONVERSION FOR NONAQUEOUS RESERVE BATTERIES.

(U)

DESCRIPTIVE NOTE: Quarterly rept. no. 14, Oct-Dec 66, AUG 67 24P Bennion, Douglas N. ;Schaer, Michael J. ;Spindler, W. C. ;

REPT. NO. NOLC-737

TASK: ORD-033-321/215-1/F009-06-04, A34-340-001/211-1/R010-01-01

MONITOR: IDEP 102.80.00.00-X7-01

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-648 706.

DESCRIPTORS: (*GUIDED MISSILE BATTERIES, ELECTROCHEMISTRY), (*ELECTROLYTES, *ORGANIC NITROGEN COMPOUNDS), (*ENERGY CONVERSION, *INFORMATION RETRIEVAL), (*BATTERY COMPONENTS, *ELECTROCHEMISTRY), NITROBENZENES, FUEL CELLS, ELECTRICAL CONDUCTIVITY, ORGANIC SOLVENTS, SULFOXIDES, OXIDATION REDUCTION REACTIONS, INFRARED SPECTRA, AMINES, DATA PROCESSING, SUBJECT INDEXING, (U)SUBJECT INDEXING, (U) IDENTIFIERS: AMMONIA-ACTIVATED BATTERIES, DINITRO BENZENES, KWIC INDEX, ORGANIC BATTERIES, SULFOXIDE/ DIMETHYL

(U)

(U)

Investigation of transport parameters of organic nitro-compounds in solution in nonaqueous electrolytes. An experimental system to measure conductivity was completed, and testing of m-DNB in liquid ammonia was begun. Solution conductance reached a maximum as temperature was increased from -60 to -20C. In addition, the solubility of m-DNB in dimethylsulfoxide was determined, and conductivity found to be about 0.001/ohm/cm in a solution saturated with LiCl or LiNO3. Attempts were made to identify by IR spectra the electroreduction products of organic nitro-compounds in acid ammonia solutions. Nitrobenzene undergoes a complete four-electron reduction to phenyl hydroxylamine, as identified by its IR spectrum. However, di-substituted nitrobenzene compounds could not be identified by IR spectra, probably because of side reactions.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 657 864 20/9 10/2

WESTINGHOUSE RESEARCH LABS PITTSBURGH PA ATOMIC AND MOLECULAR SCIENCES

BASIC PLASMA PROCESSES.

(U)

DESCRIPTIVE NOTE: Yearly summary technical rept. 16 Nov 65-30 Jun 67, JUL 67 37P Phelps, A. V. ;Chen, C. L.

REPT. NO. 67-9E2-GASES-R1

CONTRACT: Nonr-4725(00)

PROJ: NR-099-380

UNCLASSIFIED REPORT

DESCRIPTORS: (*CESIUM, RESONANCE ABSORPTION), (*FLASMAS(PHYSICS), *ENERGY CONVERSION), LINE SPECTRA, ATOMIC ENERGY LEVELS, MONOCHROMATORS, VAPORS, ALKALI METALS, THERMIONIC CONVERTERS, MAGNETOHYDRODYNAMIC GENERATORS

(U)

An experimental study of the self-broadening of cesium resonance lines was made using measurements of the transmission of white light through a cell filled with Cs. Discrepancies between previous results were resolved in favor of the older results of Gregory. It was found that recent investigators have not taken proper account of the transmission characteristics of the monochromator used in the measurements. The understanding of the role of the monochromator makes available an additional technique for the measurement of cesium and other metal vapors in power conversion devices. The results of exploratory measurements of the scattering of resonance radiation are discussed. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 655 912 10/2
WESTINGHOUSE ELECTRIC CORP YOUNGWOOD PA SEMICONDUCTC-
DIV

INVESTIGATION OF LARGE AREA DENDRITIC WEB TYPE
GERMANIUM PHOTOVOLTAIC CELLS. (U)

DESCRIPTIVE NOTE: Quarterly progress report no. 1, 15
Jul-15 Oct 66,
JUN 67 40P Ichikawa, Y. ; Merritts, T. ;

Ernick, N. ;

CONTRACT: DA-28-043-AMC-02350(E)

PROJ: DA-IC0-14501-A34A

TASK: 00

MONITOR: ECOM 02350-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, *THERMIONIC
CONVERTERS), GERMANIUM, SILICON CARBIDES, POWER
SUPPLIES, OPTIMIZATION, DIFFUSION, CRYSTAL GROWTH,
PHYSICAL PROPERTIES, MANUFACTURING
IDENTIFIERS: SEMICONDUCTOR JUNCTIONS,
THERMOPHOTOVOLTAIC CONVERTERS (U)

The report reviews design considerations that
should yield high performance large area
thermophotovoltaic cells on germanium web dendrite
material. Process techniques related to germanium
web growth for TPV cells are described. Initial
effort on junction formation by the alloying and
diffusion processes is reported. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 653 184 10/2
LIBRARY OF CONGRESS WASHINGTON D C AEROSPACE TECHNOLOGY
DIV

DIRECT ENERGY CONVERSION IN THE USSR, SOVIET SOLAR
CONCENTRATORS: COMPREHENSIVE REPORT, (U)

NOV 66 142P Litynski, Z. ;

REPT. NO. ATD-66-138

MONITOR: TT 67-62078

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Rept. on Surveys of Foreign
Scientific and Technical Literature.

DESCRIPTORS: (*SOLAR COLLECTORS, USSR), SOLAR RADIATION,
ENERGY CONVERSION, SOLAR FURNACES, CONFIGURATION,
OPTICAL EQUIPMENT, POWER SUPPLIES, THERMOELECTRICITY,
PARABOLIC BODIES, PHOTOELECTRIC EFFECT, THERMIONIC
CONVERTERS, SOLAR PANELS, CONSTRUCTION MATERIALS,
COATINGS, REVIEWS (U)

Contents: Theoretical considerations (Basic
calculations of an ideal system, Calculations of a
real concentrator, Attainable temperatures,
Precision index, Cavity calculations);
Concentrator design (Paraboloids, Multimirror
systems, Parabolic-cylindrical concentrators,
Other geometries); Concentrators for direct
energy conversion (Concentrators for applications
in space, Photovoltaic systems, Thermoelectric
systems); Materials and manufacturing processes
(Glass and aluminum, Reinforced concrete shells,
Asbestos-cements, resins, and foam materials,
Elastic membranes). (U)

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AD- 653 184

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DCC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 652 103 9/1 10/1
GENERAL MOTORS CORP KOKOMO IND DELCO RADIO DIV

STUDY OF GERMANIUM DEVICES FOR USE IN A
THERMOELECTRIC CONVERTER.

DESCRIPTIVE NOTE: Progress rept. no. 1, 1 Jul 66-1 Jan 67. (U)

FEB 67 59P Beck, R. W. ;
CONTRACT: DA-28-043-AMC-02543(E)
PROJ: DA-1CG-22001-A053
TASK: 1CG-22001-A053-01
MONITOR: ECOM 02543-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*PHOTOELECTRIC CELLS(SEMICONDUCTOR), GERMANIUM), (*ENERGY CONVERSION, PHOTOELECTRIC CELLS(SEMICONDUCTOR)), EPITAXIAL GROWTH, DOPING, COATINGS, SEMICONDUCTING FILMS, SURFACE PROPERTIES (U)

An investigation was made of the front junction P(+)/N absorptive device structure since it was felt that this device might be inherently more stable and exhibit higher values of collection efficiency. Values of collection efficiency approaching 100% were obtained but the stability in vacuum is not improved over the N/P(+) configuration. Power output of the P(+)/N is limited by the curve factor at P(+) dopings of 10 to the 18th power/cm. Increased doping of the P(+) region seriously degrades device collection efficiency. The complete reversibility of the vacuum degradation and its dependence on I sub sc levels were determined. Vacuum coating work has been extended to include silicon dioxide, silicon carbide, cadmium sulfide and others in the electron beam evaporator. None of these contributes to device stability. Increased stability of ZnS coated devices was demonstrated. Attempts to fabricate N/P(+) devices by epitaxial deposition were unsuccessful because of doping problems. Sufficient P-type layers were not obtained resulting in poor diode structures. The decision to discontinue the epitaxial work was made. Continued development of polishing techniques yielded N/P(+) nonabsorptive devices with negligible scattering losses before electroetching. (Author) (U)

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DCC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 648 379 5/1
OFFICE OF AEROSPACE RESEARCH ARLINGTON VA

AIR FORCE RESEARCH OBJECTIVES 1967. (U)

SEP 66 72P
REPT. NO. OAR-607-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR FORCE RESEARCH, MANAGEMENT PLANNING AND CONTROL), RESEARCH MANAGEMENT, SCIENTIFIC ORGANIZATIONS, PHYSICS, NUCLEAR PHYSICS, CHEMISTRY, MATHEMATICS, ENGINEERING, ELECTRONICS, MATERIALS, MECHANICS, ENERGY CONVERSION, GEODESICS, ATMOSPHERES, ASTRONOMY, ASTROPHYSICS, BIOLOGY, MEDICINE, BEHAVIOR, SOCIAL SCIENCES (U)

Contents: Research proposals: OAR organization; Research objectives: Physical sciences (General physics, Nuclear physics, Chemistry, Mathematical sciences), Engineering sciences (Electronics, Materials research, Mechanics, Energy conversion), Environmental sciences (Tennessee sciences, Atmospheric sciences, Astronomy and astrophysics), Life sciences (Biological and medical sciences, Behavioral and social sciences). (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 647 499 20/9 10/1 20/5
RAYTHEON CO WAYLAND MASS ADVANCED DEVELOPMENT LAB

SOME EFFICIENCY MEASUREMENTS OF THE THETA-PINCH. (U)

DESCRIPTIVE NOTE: Revised ed.,

DEC 65 9P Silberg, P. A. ;
CONTRACT: AF 49(638)-1420
PROJ: AF-9/68
TASK: 976802
MONITOR: AFOSR 67-0482

UNCLASSIFIED REPORT

Availability: Published in Journal of Applied
Physics v37 n5 p2155-61 Apr 1966.
SUPPLEMENTARY NOTE: Revision of manuscript submitted 12
Nov 65.

DESCRIPTORS: (*PLASMA MEDIUM, MAGNETIC PINCH),
(*MAGNETIC PINCH, *ENERGY CONVERSION), (*OPTICAL
PUMPING, LASERS), TRANSPORT PROPERTIES, EFFICIENCY,
MEASUREMENT, PLASMAS(PHYSICS), GAS DISCHARGES, PLASMA
SHEATHS, CALORIMETRY (U)

A calorimeter technique was developed to measure
the transfer efficiency of the theta-pinch in
converting capacitively stored electrical energy to
plasma energy. Circuit-decay measurements show
that the efficient theta-pinch circuit decay consists
of a two-stage circuit decay and that the inefficient
theta-pinch consists of a three-stage decay. With
the use of the circuit decay data, a modified
transfer efficiency measurement technique was
developed for a two-stage decay which is
approximately as accurate as the calorimeter
technique and very much quicker and easier to make.
Measurements were made to evaluate the transfer
efficiency of the theta-pinch in argon at pressures
of 2 and 5 Torr with different tube sizes and with
different coupling impedances. These measurements
show that within the present range of parameter
values a transfer efficiency as high as 59% is
possible. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07
AD- 644 735 10/1 7/4 6/1 6/4
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)

MECHANOCHEMICAL ENGINES. (U)

DESCRIPTIVE NOTE: Interim rept.,

66 9P Steinberg, I. Z. ; Oplatka, A. ;
Katchalsky, A. ;
CONTRACT: AF 61(052)-919
PROJ: AF-9777
TASK: 977701
MONITOR: AFOSR 66-2617

UNCLASSIFIED REPORT

Availability: Published in Nature v210 n5036 p568-71
May 7 1966.

DESCRIPTORS: (*ENGINES, ENERGY CONVERSION), (*COLLAGEN,
*ENERGY CONVERSION), ELECTROLYTES, LITHIUM COMPOUNDS,
BROMIDES, POLYMERS, CONTRACTION, POWER, EQUATIONS,
ISRAEL, (U)ISRAEL (U)
IDENTIFIERS: MECHANOCHEMICAL MACHINES (U)

A description is given of the isothermal conversion
of chemical metabolic energy and mechanical work.
Given are several diagrams of machines which can be
run for varying periods of time by running collagen
fibers into a solution of strong salts, i.e. lithium
bromide and out over various pulleys into pure water.
The amount of energy converted into work is given
and formulas are given which describe the adequate
length relation to the different parts of the
collagen fibers and the constant effect of different
concentrations of salts upon the mechanical power
developed. Given also are diagrams of mechanical
engines for converting chemical work directly into
mechanical work. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 644 284 10/2
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

THERMOPHOTOVOLTAIC ENERGY CONVERSION, (U)

66 5P Kittl, Emil ;

UNCLASSIFIED REPORT

Availability: Published in Proceedings of Annual Power Sources Conference (20th) May 24-26 1966.

DESCRIPTORS: (*ENERGY CONVERSION, *THERMIONIC CONVERTERS), THERMOELECTRICITY, PHOTOELECTRIC CELLS(SEMICONDUCTOR), GERMANIUM, POWER SUPPLIES IDENTIFIERS: THERMOPHOTOVOLTAIC CONVERTERS (U)

The effort to improve spectral efficiency of the TPV system yielded the following results. At present, the IR-transparent Ge cell approach with the reflective electrode on the back side offers the best spectral efficiency. However, this cell design is not fully optimized for electrical output and therefore the overall system efficiency is below the value that can be realized with a good absorptive type cell combined with the best available front surface multi-layer interference filter. Further design improvements on the IR-transparent cell should easily bridge the gap of overall performance that now exists between the front reflector and back reflector type cells. Such improvement in design and performance seems possible with the epitaxial N/P(+) type or the PIN-junction type cells which will be discussed in a paper by Bruce Wedlock. Very encouraging results have been obtained in an initial survey of rare earth type selective emitters by using a mixture of Erbiumoxide and Thoriumoxide in a configuration similar to the well known Auer Weisbach mantle. The demonstrated fuel to electric output conversion efficiency of 4.35% is remarkable. A factor 2 improvement of this value seems possible by merely increasing the radiation density incident on the cell. With these improvements in spectral efficiency and further development effort on the germanium cell, practical TPV power sources are feasible within the next 5 years. (U)

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AD- 643 791 10/1 20/3
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

ENERGY STORAGE AND ENERGY CONVERSION THROUGH HIGH MAGNETIC FIELDS FROM SUPERCONDUCTORS, (U)

66 4P Gaule, G. K. ; Buser, R. G. ;
Ross, R. L. ; Kainz, J. ;

UNCLASSIFIED REPORT

Availability: Published in Annual Proceedings Power Sources Conference (20th), May 24, 25, 26, 1966.

DESCRIPTORS: (*ENERGY CONVERSION, *SUPERCONDUCTORS), MAGNETIC FIELDS, COILS, MAGNETS, ENERGY, STORAGE (U)

The essential physical feature in the energy storage and conversion systems discussed here is the large magnetic energy provided in a moderate volume by the superconductor and its coupling to a 'load coil'. Extensive use of plastics, will be made in the construction of future models. Plastics, as insulators, are 'transparent' for transient magnetic fields. Greatly simplified explosive drives for flux displacers, and inductive storage with inductive coupling thus become possible. Plastic cryostats are also very lightweight and capable of intercepting and dampening forces acting on the solenoid. Multiple use of the available magnetic energy will be made by using the dipole field from a horizontal solenoid and a rotating flux displacer, possibly driven by a gas turbine. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 642 219

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MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

STRUCTURE OF EQUATIONS SPECIFYING OPERATING
CHARACTERISTICS OF ENERGY CONVERTERS CONSTRUCTED OF
ANISOTROPIC MATERIALS. (U)

OCT 65 12P

Honig, J. M. ; Harman, T. C. ;

REPT. NO. JA-2698

CONTRACT: AF 19(628)-5167

MONITOR: ESD TR-66-421

UNCLASSIFIED REPORT

Availability: Published in Advanced Energy

Conversion v6 p149-58 1966.

DESCRIPTORS: (*ENERGY CONVERSION, ANISOTROPY),
(*GENERATORS, ENERGY CONVERSION), (*REFRIGERATION
SYSTEMS, ENERGY CONVERSION), OPTIMIZATION, EQUATIONS,
TRANSPORT PROPERTIES, TEMPERATURE, THERMODYNAMICS,
SEEBECK EFFECT, OPERATION (U)

IDENTIFIERS: GALVANOTHERMOMAGNETIC EFFECT (U)

The expressions for efficiency and coefficient of performance of galvano-thermomagnetic energy converters were re-examined to determine what mathematical constraints are needed to guarantee that these quantities remain real, non-negative, and subject to the Carnot requirement. These constraints lead to conditions that must be satisfied by the anisotropy parameters, the transport coefficients, and the temperature differences within the device arms. Conditions for operating the devices at Carnot efficiency are also spelled out. In the appendix it is proved mathematically that no more than one device arm is needed for optimal operation of thermomagnetic converters and refrigerators. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 642 211

10/1

MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

A NOTE CONCERNING THE TEMPERATURE PROFILE WITHIN A
THERMOMAGNETIC ENERGY CONVERTER, (U)

AUG 65 8P

Harman, T. C. ; Honig, J. M. ;

REPT. NO. JA-2633

CONTRACT: AF 19(628)-5167

MONITOR: ESD TR-66-375

UNCLASSIFIED REPORT

Availability: Published in Advanced Energy

Conversion v6 p127-31 1966.

DESCRIPTORS: (*ENERGY CONVERSION, THERMODYNAMICS),
(*GENERATORS, ENERGY CONVERSION), (*REFRIGERATION
SYSTEMS, ENERGY CONVERSION), TEMPERATURE, DISTRIBUTION,
TRANSPORT PROPERTIES, APPROXIMATION(MATHEMATICS) (U)

IDENTIFIERS: GALVANOTHERMOMAGNETIC EFFECT (U)

Temperature profiles were determined for galvano-thermomagnetic energy converters operating either as generators or as refrigerators. A comparison is made between results obtained with and without approximations in the fundamental theory. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. - ZOM07

AD- 639 532

10/1

6/4

WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL) DEPT OF
BIOPHYSICS

CHEMICAL ENGINES.

(U)

MAR 66 6P Clarke, Robin ; Katchalsky.

Aaron ;

CONTRACT: AF-EOAR-25-64.

PROJ: AF-9777,

TASK: 977701,

MONITOR: AFOSR

66-0967

UNCLASSIFIED REPORT

Availability: Published in Science Journal p80-84
Mar 1966.

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENGINES, ENERGY CONVERSION), (*COLLAGEN,
*ENERGY CONVERSION), ELECTROLYTES, POLYMERS, (U)
CONTRACTION, MEMBRANES, ISRAEL, (U)ISRAEL (U)
IDENTIFIERS: MECHANOCHEMICAL MACHINES

The report, presented in vcrbatim interview form,
concerns the development of a machine which converts
chemical energy directly into mechanical form.
Consideration is given to the implications the
machine has for both technology and the life
sciences. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 639 514

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WEIZMANN INST OF SCIENCE REHOVETH (ISRAEL) POLYMER
DEPT

MECHANOCHEMISTRY.

(U)

JUL 66 27P

Katchalsky, A. ; Oplatka, A. ;

CONTRACT: AF-EOAR-62-58,

PROJ: AF-9777,

TASK: 977701,

MONITOR: AFOSR

66-1460

UNCLASSIFIED REPORT

Availability: Published in Proceedings of
International Congress Rheology (4th) p73-97.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, THERMODYNAMICS),
(*COLLAGEN, ENERGY CONVERSION), (*ENGINES, ENERGY
CONVERSION), ELECTROLYTES, POLYMERS, ENERGY,
CONTRACTION, MELTING, LOADS(FORCES), ISRAEL,
(U)ISRAEL (U)

IDENTIFIERS: MECHANOCHEMICAL MACHINES,
MECHANOCHEMISTRY (U)

Consideration is given to the development of the
mathematics relating the conversion of chemical
energy to mechanical work, without the necessity of a
'heat-engine' viewpoint. The thermodynamics of the
system of this conversion is given in detail and some
of the mechanisms are subject to formal mathematical
expression. This treatment yields a coherent
theory for the mechano-chemical engine. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 638 363 10/1 7/4
TYCO LABS INC WALTHAM MASS

A UNIFIED APPROACH TO ENERGETICS RESEARCH, VOLUME
II. (U)

DESCRIPTIVE NOTE: Final rept., Jun 63-Sep 65.

DEC 65 305P Rosenberg, A. J.; Makrides, A. C.

; Miavsky, A. I.;

CONTRACT: AF 19(628)-2845,

PROJ: AF-8608,

TASK: 860809,

MONITOR: AFRL 66-134-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, SCIENTIFIC RESEARCH),
(*ENERGY MANAGEMENT, SCIENTIFIC RESEARCH), SILICON
COMPOUNDS, CARBIDES, ANODES, CATHODES, PHOTOSYNTHESIS(U)

Contents: Introduction: Investigations on
Silicon Carbide; The preparation of high purity
silicon carbide; The growth of SiC single
crystals from solution; The preparation of alpha-
SiC p-n diodes; Electrical and optical
properties of alpha-SiC p-n junction diodes;
Introduction: Anodic processes; Fuel cell
catalysts - nickel boride; Catalysts for hydrazine
fuel cell anodes; Electrochemical oxidation of
alkali borohydrides; Surface reactions of nickel
and nickel boride electrodes; Introduction:
Cathodic processes; The adsorption of oxygen by
III-V compounds and germanium at 78K; Kinetic
transitions in the oxidation of InSb, Ge, and
Sb; The reduction of anodic oxide films on Au
in HClO4 solutions with linear potential sweeps;
Cobalt phthalocyanine as a fuel cell cathode;
Introduction: Photobiological Studies;
Interactions between daylength and light intensity
in the growth and chlorophyll content of
Acetabularia Crenulata; The endogenous
regulation of the quantum yield of photosynthesis by
circadian rhythms. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 638 362 10/1 20/12
TYCO LABS INC WALTHAM MASS

A UNIFIED APPROACH TO ENERGETICS RESEARCH, VOLUME
I. (U)

DESCRIPTIVE NOTE: Final rept., Jun 63-Sep 65.

DEC 65 386P Rosenberg, A. J.; Makrides, A. C.

; Miavsky, A. I.;

CONTRACT: AF 19(628)-2845,

PROJ: AF-8608,

TASK: 860809,

MONITOR: AFRL 66-134-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, SCIENTIFIC RESEARCH),
(*ENERGY MANAGEMENT, SCIENTIFIC RESEARCH), ELECTRONS,
PHONONS, PHOTONS, SOLAR CELLS, SEMICONDUCTORS, ENERGY (U)

Contents: Introduction: Electron-Phonon
Interactions; Theory of acoustic-electron
interactions in piezoelectric semiconductors;
Electromechanical behavior of single crystal
SrTiO3; Effect of invariance requirements on
the elastic strain energy of crystals with
application to the diamond type of crystal;
Introduction: Photon-Phonon Interactions;
Photon-phonon interactions in the near infrared;
Higher order moments and multiphonon effects in
non-metallic crystals; Dielectric constant in
paraelectric perovskites; Infrared studies of
perovskite titanates; Dielectric dispersion of some
perovskite zirconates; Normal modes in hexagonal
boron nitride; Introduction: Electron-phonon
Phonon Interactions; Photovoltages at abrupt
junctions between photoconductors and between
photoconductor and semiconductor; Ultraviolet
reflection spectrum of cubic CdS; Solar cells
for high temperature use; Surface states and
photovoltaic effect on silicon-metal interfaces;
The origin of surface on silicon; The current
dependence of injection luminescence; Photoeffects
in organic conductors; Thin film crystal growth for
large-area solar cells; Appendix to Volume I. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 637 917 7/4 10/1 6/1
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)

MECHANOCHEMISTRY.

(U)

66 5P Katzir, Aharon ;
MONITOR: AFOSR 66-1475

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, REVIEWS), (*POLYMERS,
ENERGY CONVERSION), BIOCHEMISTRY, CONTRACTION,
ELECTROLYTES, COLLAGEN, MOLECULAR ASSOCIATION, ENGINES,
MOTORS, PUMPS, ISRAEL (U)

IDENTIFIERS: MECHANOCHEMISTRY, MECHANOCHEMICAL
MACHINES (U)

Contents: Biological mechanochemical
conversions; Mechanochemical coupling; The
informative ability of dynamic macromolecules;
Collagen fibers as a model; Mechanochemical
engines and pumps. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 636 954 10/2 20/12 11/2
NORTHEASTERN UNIV BOSTON MASS

LITERATURE SURVEY ON THE SURFACE STRUCTURES OF
REFRACTORY METALS WITH REFERENCE TO THE THERMIONIC
EMISSION AND ENERGY CONVERTERS. (U)

JUN 66 48P Nowak, Melville B.; Babakian,

Jacob ;

REPT. NO: Scientific-5,
CONTRACT: AF 19(628)-3836,
PROJ: AF-8659,
TASK: 865901, 865902 66-362
MONITOR: AFCL

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, REFRACTORY METALS),
(*REFRACTORY METALS, *THERMIONIC EMISSION), (*REVIEWS,
*CRYSTAL STRUCTURES), SURFACE PROPERTIES, WORK
FUNCTIONS, ANODES, CATHODES (U)

The thermionic converter directly transforms heat
into electricity. The conversion efficiency of
these devices is maximized when the emitter and
collector surfaces have optimum work functions that
are uniform over the surfaces. This implies a
surface consisting of a single type of
crystallographic plane. A review of the literature
has been made with respect to the surface structures
of the refractory metals and the treatments producing
these structures. There is direct evidence that
single crystals, properly treated, and that well-
oriented, properly-treated polycrystalline material
can provide surfaces with relatively uniform work
functions. There is reason to believe that, with
suitable chemi-thermal treatments and induced
material transport, one could produce a uniform work
function surface on randomly oriented,
polycrystalline material. (Author) (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 636 496 8/10 10/2 20/13
NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF

UNDERSEA GEOTHERMAL DEPOSITS, THEIR SELECTION AND
POTENTIAL USE. (U)

DESCRIPTIVE NOTE: Research rept.

JUL 66 76P Austin, C. F. ;

REPT. NO. N0TS-TP-4122,

TASK: R360-FRI06/216-1/R011-01-01,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MARINE GEOPHYSICS, *STEAM POWER PLANTS),
MARINE GEOLOGY, THERMODYNAMICS, STEAM, GEOCHEMISTRY, (U)
ENERGY CONVERSION, POWER SUPPLIES (U)
IDENTIFIERS: GEOTHERMAL DEPOSITS (U)

Geothermal deposits beneath the ocean floor appear to be the principal indigenous energy source available to installations in the deep-sea environment and are the only apparent alternative indigenous power source to fossil fuels in the continental shelf and slope environment. This study presents a review of geothermal deposits from four points of view: (1) locating potential geothermal deposits at or near which undersea installations might be established; (2) waste disposal considerations; (3) the estimation of deposit structure, chemistry, and size prior to development; and (4) the use of geothermal deposits in the undersea environment including their relative merits as opposed to fossil fuels and reactors. (Author) (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 636 494 10/2 10/1 9/1
GM DEFENSE RESEARCH LABS SANTA BARBARA CALIF LAND
OPERATIONS DEPT

ENGINEERING INVESTIGATION OF A THERMOPHOTOVOLTAIC
ENERGY CONVERTER. (U)

DESCRIPTIVE NOTE: Final technical rept., 23 Dec 64-3
May 66.

JUN 66 192P Haushalter, Roger W. ;

REPT. NO. GM-DRL-TR-66-26

CONTRACT: DA-44-009-AMC-622(T),

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMOELECTRICITY, GENERATORS),
(*PHOTOELECTRIC CELLS(SEMICONDUCTOR), *ENERGY
CONVERSION), ELECTRIC POWER PRODUCTION, POWER SUPPLIES,
MATHEMATICAL ANALYSIS, PERFORMANCE(ENGINEERING), COOLING,
+ VENTILATING EQUIPMENT (U)
IDENTIFIERS: THERMOPHOTOVOLTAIC CONVERTERS (U)

Work described in this report consists of studies of lightweight, portable, aircooled thermophotovoltaic (TPV) energy conversion systems to determine the feasibility of developing such systems to meet six specific army applications. The specific applications are for operation at 125F ambient temperature and delivery of: 300 watt net power at a system weight of 35 lb with and without fuel, 500 watt net power at a system weight of 35 lb with and without fuel, 3,000 watt at system weights of 100 and 150 lb, each without fuel. A mathematical analysis, programmed for computation with a digital computer, was made of a TPV system. By use of the program, best values were determined for the system component parameters, and the photovoltaic devices required to meet the desired system specifications were defined. External reflective filters for use in combination with absorptive photovoltaic devices were designed, procured, and optically evaluated independently and as mounted on photocells. Studies were also carried out with respect to photocell temperature sensitivity, theoretically limited and practically achievable photovoltaic device performance, and cell design and fabrication. (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 635 584 10/1
NAVAL RESEARCH LAB WASHINGTON D C

DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS. (U)

JUN 66 122P
REPT. NO. 11,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*BIBLIOGRAPHIES, *ENERGY CONVERSION);
ABSTRACTS, THERMOELECTRICITY, THERMIONIC CONVERTERS,
THERMIONIC EMISSION, PHOTOELECTRIC EFFECT,
MAGNETOHYDRODYNAMICS, ELECTROCHEMISTRY, NUCLEAR
REACTORS, BATTERY COMPONENTS, ELECTRIC BATTERIES (U)

A collection of references from various sources
covering the current literature on thermoelectricity,
thermionics, thermionic emission, photoelectric processes,
magnetohydrodynamics, electrochemical processes,
energy storage, and energy sources. (Author) (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 635 007 19/1 10/1
FRANKFORD ARSENAL PHILADELPHIA PA PROPELLANT ACTUATED
DEVICES DIV

NEW FUNDAMENTAL MECHANISM FOR AN ENERGY CONVERSION
DEVICE. (U)

DESCRIPTIVE NOTE: Technical research rept. 1 Jul 62-31
JUL 65,

APR 66 57P Pisano, Frank T. ;
MONITOR: FA R-1812

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CARTRIDGES(PAD), *ENERGY CONVERSION),
PNEUMATIC DEVICES, HYDRAULIC EQUIPMENT, POWER EQUIPME (U)

This report summarizes the theoretical and
experimental studies conducted on a hot gas motor, a
fundamentally new mechanism, as an energy conversion
device. In the theoretical study, the relationship
of the working components was determined and
optimized for maximum conversion of fluid potential
and kinetic energy into useful mechanical work. A
test model of the hot gas motor was fabricated and a
limited series of test runs was conducted, using both
cold and hot gas. This report also presents a
design discussion, a vector analysis, and test data
of this novel motor. (Author) (U)

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DCC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 630 041 10/2

MINNESOTA MINING AND MFG CO ST PAUL

300 WATT PORTABLE THERMOELECTRIC GENERATOR. (U)

DESCRIPTIVE NOTE: Monthly progress rept. no. 12, 28 Feb 66. (U)

FEB 66 SP Nystrom, T. L. ;
CONTRACT: N600(61533)62758,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-621 350.

DESCRIPTORS: (*THERMOELECTRICITY, POWER SUPPLIES),
(*GENERATORS, THERMOELECTRICITY), (*ELECTRIC POWER,
THERMOELECTRICITY), PORTABLE EQUIPMENT, THERMOCOUPLES,
ENERGY CONVERSION, HERMETIC SEALS, (U)
PERFORMANCE(ENGINEERING) (U)
IDENTIFIERS: THERMOELECTRIC POWER GENERATION (U)

A complete generator system was assembled and tested. Test results demonstrate that the basic design is sound in that all system components function properly. The test results show: the hermetic seal lacks the required reliability; the system, excluding fuel, is 3 pounds too heavy; and the fuel consumption is 15% too high to meet the requirements of 35 pounds system weight including fuel for 8 hours for operation. (U)

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AD- 629 241

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DCC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 629 241 10/2 10/1

WISCONSIN UNIV MADISON SOLAR ENERGY LAB

PHOTOVOLTAIC POWER SYSTEMS USING HIGH SOLAR ENERGY FLUXES. (U)

DESCRIPTIVE NOTE: Final rept., 1 Mar 64-30 Nov 65,
DEC 65 73P Schoffer, P. ; Beckman, W. ;
CONTRACT: DA-28-043-AMC-00005(E),
PROJ: DA-1C6-22001-A-053,
TASK: 01, (U)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-458 879.

DESCRIPTORS: (*SOLAR CELLS, ENERGY CONVERSION), (*ENERGY
CONVERSION, SOLAR CELLS), (*POWER SUPPLIES, SOLAR
CELLS), ELECTRIC POWER PRODUCTION, SILICON, REFLECTORS,
COOLING + VENTILATING EQUIPMENT, HEAT,
PERFORMANCE(ENGINEERING), EFFECTIVENESS, HEAT
EXCHANGERS (U)

Experimental data is presented on the operation of a high solar flux power system. Using 18 one by two cm cells with 20 gridlines/cm and with a concentrated solar flux of about 25 W/sq cm, the system produced 40 watts of electrical power. Approximately 5 of the 40 watts are necessary for the cooling system pump motor. The expected net output of 50 watts was not obtained due to low cell efficiencies and nonuniform flux distribution. Probable reasons for the low cell efficiencies are discussed and a method for obtaining a more uniform flux distribution is presented. Tests on the individual cooling system components are also presented. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 628 529 10/1 7/4
STANFORD UNIV CALIF DEPT OF MECHANICAL ENGINEERINGDIRECT ENERGY CONVERSION SYSTEMS. PART II.
ELECTROCATALYTIC ACTIVITY OF HYDRAZINE IN FUEL CELL
APPLICATION. (U)

DESCRIPTIVE NOTE: Quarterly technical rept.,

SEP 65 67P Stonehart, Paul D. ;

CONTRACT: AF 49(638)-1123, ARPA Order-246

PROJ: AF-4661,

MONITOR: AFOSR . 66-0226

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, FUEL CELLS), (*FUEL CELLS, CATALYSIS), (*HYDRAZINE, FUEL CELLS), (*CARBON MONOXIDE, FUEL CELLS), ELECTRODES, ELECTROCHEMISTRY, ACIDS, BASES(CHEMISTRY), OXIDATION REDUCTION REACTIONS, PLATINUM, CHEMICAL, FILMS, CARBON DIOXIDE, OXIDES, CARBINOLS, CHEMICAL REACTIONS (U)

The electrode reactions of hydrazine in acid and basic solutions on smooth and platinised platinum were examined. From analysis of the rest potentials and concentration relationships a rapid one electron exchange with a stable surface species is postulated. The mechanism of oxidation occurs via a sequential system whereby hydrazinium radicals are the products of the initial oxidation. The electrode reactions of carbon monoxide in acid solutions on smooth platinum electrodes were also examined. The carbon monoxide is strongly bound to the metal surface and probably exists as a compound. Suppression of the reversible hydrogen reaction was observed in the presence of CO. Removal of the carbon monoxide film was performed as soon as oxide formation occurred indicating that the carbon monoxide is essentially electroinactive and that the reaction is purely chemical with the metal oxide to form carbon dioxide. Electrochemical regeneration of the metal oxide forms the regenerative cycle. $M_0 + CO > M + CO_2$; $M + H_2O > M_0 + 2H^+ + 2e^-$. The oxidation of methanol in acid does not proceed via carbon monoxide as an intermediate. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 628 049 10/1
NAVAL RESEARCH LAB WASHINGTON D C

DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS. (U)

DEC 65 156P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, ABSTRACTS), THERMOELECTRICITY, THERMIONIC CONVERTERS, PHOTOELECTRIC EFFECT, MAGNETOHYDRODYNAMICS, ELECTROCHEMISTRY, NUCLEAR REACTORS, BIBLIOGRAPHIES, PATENTS (U)

This is the tenth in a series of bibliographies covering unclassified literature related to the direct conversion of energy. Subject coverage includes energy conversion, thermoelectricity, thermionics, photovoltaic, magnetohydrodynamics, electrohydrodynamics, electrochemical, nuclear and energy storage. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 627 658 10/1 20/9 7/4 20/3
STANFORD UNIV CALIF

DIRECT ENERGY CONVERSION SYSTEMS. (U)

DESCRIPTIVE NOTE: Final technical rept. 1 Nov 61-30

Sep 65, OCT 65 Eustis, Robert H. ;
CONTRACT: AF49(638)-1123 ,ARPA Order-246
MONITOR: AFOSR , 65-2013

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-609 415.

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMIC),
(*MAGNETOHYDRODYNAMIC GENERATORS, ENERGY),
(*ELECTROCHEMISTRY, ENERGY CONVERSION),
(*THERMOELECTRICITY, ENERGY CONVERSION), HEAT TRANSFER,
FLUID FLOW, SHOCK TUBES, ELECTRODES, OXIDATION,
HYDRAZINE, CARBINOLS, CHEMISORPTION, REACTION
KINETICS (U)

A brief summary is presented of the research conducted. Details of the work are reported in earlier reports. The scope of this program has included magnetogasdynamic, electrochemical, and thermoelectric studies. In addition to a summary of the research work, 22 technical papers and ten theses, generating from this work, are listed.
(Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 625 198 10/1 20/12 11/6 11/2
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D
C

MATERIALS FOR HIGH-TEMPERATURE ENERGY CONVERTERS: (U)

ANNOTATED BIBLIOGRAPHY

DESCRIPTIVE NOTE: Rept. no. 1 on ATD work assignment no.
79, task 22, DEC 65 Slesarenko, Michael ;
REPT. NO. ATD-65-112
MONITOR: TT, 66-60037

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Based on Soviet open-source materials for 1955-1960. Rept. on Surveys of Soviet Scientific and Technical Literature.

DESCRIPTORS: (*MATERIALS, ENERGY CONVERSION), (*ENERGY CONVERSION, MATERIALS), (*BIBLIOGRAPHIES, ENERGY CONVERSION), HIGH TEMPERATURE, USSR, ABSTRACTS, INDEXES, SEMICONDUCTORS, ALLOYS, CERAMIC MATERIALS, INTERMETALLIC COMPOUNDS (U)

This annotated bibliography is based on Soviet opensource materials available at the Aerospace Technology Division and the Library of Congress and covers the years 1955 through 1960. Information not confined to the assigned subject has been included because of its broad implications for study in this field. Titles of Soviet monographs are given in transliterated form, followed by the English translation. Library of Congress call numbers are included at the end of an entry when the item is cataloged and available in the collections of the Library. Call numbers of journals and periodicals frequently referred to in the bibliography are given once, at their first appearance. Translations are indicated when available, and abstracts already available in English are indicated where applicable.
(Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 623 096

GENERAL MOTORS CORP INDIANAPOLIS IND ALLISON DIV

MEASUREMENT OF FLUID PROPERTIES FOR MAGNETOPLASMA-DYNAMIC POWER GENERATORS.

(U)

DESCRIPTIVE NOTE: Quarterly technical summary rept. no. 9, 1 May31 Aug 65,

SEP 65

Schneider, R. T. ; Myers, F. G.

REPT. NO. EDR-4400

CONTRACT: Nonr-410400

PROJ: ARPA order 420

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-616 260.

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), (*MAGNETOHYDRODYNAMICS, FLUID DYNAMICS), GENERATORS, DESIGN, HEATERS, PLASMA MEDIUM, OPERATION, MEASUREMENT (U)

A closed loop MPD power generation device was designed, constructed, and operated. Two modes of operation were observed--saturating and nonsaturating. The saturating mode is associated with low seeding ratios while the nonsaturating mode is associated with high seeding ratios and high leakage resistances. During operation, leakage resistances varied between 0.1 and 1.0 megohms. Of the two modes observed, only the saturating mode was investigated thoroughly. The observations were made under the following conditions: Pressure--slightly above atmospheric, Magnetic field--up to 21,500 gauss, Velocities--up to 250 m/sec at the channel entrance, Temperatures (static)--up to 1500K. For the saturating mode at these conditions, no nonequilibrium ionization was observed. Theoretical considerations indicate that to observe nonequilibrium ionization, runs should be made at lower pressures and higher velocities and temperatures than those stated previously.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 622 945

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTROICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION.

(U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no. 8, 1 Jun-31 Aug 65,

AUG 65

Jackson, W. D. ; Brown, G. A. ;

Kerrebrock, J. L. ; Stickney, R. E. ;

CONTRACT: AF33 615 1083

PROJ: 5350

TASK: 535004

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-618 071.

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), (*MAGNETOHYDRODYNAMICS, ENERGY CONVERSION), (*THERMIONIC CONVERTERS, MATERIALS), STEAM, CONDENSERS (LIQUEFIERS), JET PUMPS, PLASMA MEDIUM, FLUID DYNAMICS, ALKALI METALS, VAPORS, SINGLE CRYSTALS, TUNGSTEN, EMISSIVITY, BRAYTON CYCLE, GENERATORS (U)

Brief summaries are given of progress on the following projects: Liquid-metal pumps for magnetohydrodynamic power generation; Liquid-metal magnetohydrodynamic generators; Alkali-metal vapor magnetohydrodynamic generator; Segmented-electrode generator experiment; Thermionic emission from a tungsten crystal; Bonding mechanisms of alkali-metal atoms adsorbed on metal surfaces; Volume ionization mechanisms and transport properties of thermionic diodes; Collisionless thermionic converters. Also included are the following detailed reports: Steam-water condensing ejector test facility; Magnetohydrodynamic channel flow velocity profiles and entry length; Thermionic emission from a tungsten monocrystal in oxygen; Characteristics of a pure alkalimetal vapor plasma; Brayton cycle magnetohydrodynamic power generation.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 622 398

PHILCO NEWPORT BEACH CALIF AERONUTRONIC DIV

CHEMICALLY PUMPED LASER SYSTEM.

(U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 1, 25 Jun 64-31 Jul 65,

AUG 65

Byron, S. ; Kuby, W. ; Lawrence, W.

: Finizie, R. V. ;

REPT. NO. U-3259

CONTRACT: DA36 034AMC0325T

PROJ: 1F5 23801D358

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LASERS, PUMPING(ELECTRONICS)), (*PUMPING(ELECTRONICS), LASERS), (*ENERGY CONVERSION, CHEMICAL REACTIONS), (*CHEMICAL REACTIONS, PUMPING(ELECTRONICS)), PYROTECHNICS, SHOCK TUBES, XENON, SHOCK WAVES, OPTICS, EYE, MONEYS, BURNS(INJURIES) (U)

A summary is given of the state of the art in chemical pumping of lasers, the potential performance by various approaches is evaluated, and the specific approach chosen for further development under this contract is described. The program plan for the remainder of the contract is outlined and progress during the past quarter is described. During this quarter an experimental evaluation of various radiation coupling geometries and window materials led to a successful test in which laser action was produced in a ruby by shock heated xenon. A summary is also given of earlier studies by the Bio-Technology Department of the Philco C and E Division, Blue Bell, Pennsylvania, which were directed toward measuring eye damage in monkeys caused by laser irradiation. (Author) (U)

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AD- 621 806

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 621 806

AEROSPACE INFORMATION DIV LIBRARY OF CONGRESS WASHINGTON D C

THE METHODS OF DIRECT CONVERSION OF ENERGY, (U)

DEC 63 9P Lashkarev, G. V. ; Fomenko, V. S. ;

REPT. NO. AID-T-63-119c

MONITOR: TT, 65-64059

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Akademiya Nauk SSSR. Izvestiya. Energetika i Transport, n4 p145-50 1962.

DESCRIPTORS: (*ENERGY CONVERSION, SYMPOSIA), THERMIONIC CONVERTERS, MAGNETOHYDRODYNAMICS, THERMOELECTRICITY, THERMIONIC EMISSION, FUEL CELLS, USSR (U)

Papers are presented on problems of direct conversion of energy by the magneto-gas-dynamic, thermoelectronic, thermoelectronic, and chemical methods. Ten reports and communications were presented on the physical fundamentals, experimental results, and some problems of the theory and practice of designing various converters. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 621 726

LIBRARY OF CONGRESS WASHINGTON D C AEROSPACE TECHNOLOGY DIV

DIRECT ENERGY CONVERSION IN THE USSR, THERMIONIC CONVERTERS. (U)

DESCRIPTIVE NOTE: Rept. no. 3.

SEP 65 155P

REPT. NO. ATD-P-65-57

MONITOR: IT, 55-64029

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Rept. on Surveys of Soviet-Bloc Scientific and Technical Literature.

DESCRIPTORS: (*THERMIONIC CONVERTERS, ENERGY CONVERSION). (*ENERGY CONVERSION, THERMIONIC CONVERTERS). THERMIONIC EMISSION, VOLTAGE, SPACE CHARGE, TRANSPORT PROPERTIES, PLASMAS(PHYSICS), IONIZATION, USSR (U)

CONTENTS: Thermoelectron emission; Volt-ampere characteristic and difference of contact potential; Positive surface ionization and evaporation heats; Space-charge and its neutralization; Transport phenomena; Qualitative theory of plasma thermoelements; Classification schemes; Vacuum with current limited by space-charge; Vacuum with space-charge compensated (Anselm's theoretical study; Rectilinear-path mode; Ioffe's concept of a plasma thermocouple; Simple diffusion mode (Muyzhes-Pikus Theoretical Study); Phenomena at increased plasma pressures; Discharge mode (Baksh-Moyzhes Theoretical Study); Arc mode. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 621 250

STANFORD RESEARCH INST MENLO PARK CALIF

ENERGY CONVERSION TECHNIQUES FOR MICROWAVE GENERATION. (U)

DESCRIPTIVE NOTE: Final technical rept. for 30 Mar 64-15

May 65,

REPT. NO. 4913

CONTRACT: AF30 602 3368

PROJ: 4506

TASK: 450603

MONITOR: RADC, TR-65-254

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*RADIOFREQUENCY GENERATORS, ENERGY CONVERSION), (*ENERGY CONVERSION, MICROWAVE OSCILLATORS), (*MICROWAVE OSCILLATORS, ENERGY CONVERSION), (*PULSE GENERATORS, MICROWAVES), ELECTRIC DISCHARGES, SPARKS, MICROWAVE EQUIPMENT, RADIOFREQUENCY PULSES, CIRCUITS, ELECTRICAL ENGINEERING (U)

Converters were studied, using spark gaps operating in various types of microwave structures. The general design principles that have emerged from this study are discussed in considerable detail. It is recognized that the use of spark gaps for RF generation is generically related to the devices used by early workers, and to certain devices currently being studied for sub-microwave operation. A survey of some of the more notable steps in the historical development of such devices is included. The work, in general, demonstrates that spark gaps can be used for the generation of short (e.g., 100 periods) pulses of microwave energy. It also demonstrates that this method of generating power does require very careful attention to the integrated design of the spark gap and its associated microwave and driving circuitry. The interactions between the spark gap and both the microwave circuitry and the driving circuitry are, in some cases, quite subtle. At this stage in the understanding of the process, it is not sufficient to study the different components separately. It is, instead, of paramount importance to study in detail the performance of the system as a functioning whole. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 619 718

MINNESOTA MINING AND MFG CO ST PAUL

300 WATT PORTABLE THERMOELECTRIC GENERATOR. (U)

DESCRIPTIVE NOTE: Monthly progress rept. no. 10 for period ending 31 Jul 55.

JUL 65

GP Carleton, R. D. ;

CONTRACT: N600 61533 62758

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also 618 037.

DESCRIPTORS: (*THERMOELECTRICITY, POWER SUPPLIES), (*GENERATORS, THERMOELECTRICITY), (*ELECTRIC POWER PRODUCTION, THERMOELECTRICITY), PORTABLE EQUIPMENT, THERMOCOUPLES, ENERGY CONVERSION, HEAT TRANSFER, TESTS, FUELS. HYDROCARBONS (U)

Assembly of the first prototype 300 watt generator was completed and testing begun. Upon initial start-up two or more short circuits developed between the main section of the thermopile and the case. Information on thermopile performance was obtained from the 27 couple fan circuit which was isolated from the main thermopile and the case. Power output from the fan circuit was 34.2 watts at average junction temperatures of 1100F and 300F. This implies a gross power output from the entire thermopile (270 couples) of 342 watts. Average fin base temperature on the heat sink was 250F, as predicted. Fuel consumption was approximately 1.45 lbs/hr which is somewhat greater than anticipated but it is felt that this can be reduced by modifications to the burner. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 619 655

NAVAL ORDNANCE LAB CORONA CALIF

CHEMOELECTRIC ENERGY CONVERSION FOR NONAQUEOUS RESERVE BATTERIES. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 8, Apr-Jun 65,

JUL 65

22P Panzer, R. E. ; Harris, W. S. ;

Daley, J. C. ; McWilliams, G. E. ;

TASK: RRRE06 017 211 1F009 06 05, R360FR104 211

1R011 01 01

MONITOR: NAVWEPS , 8821

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-616 549.

DESCRIPTORS: (*ENERGY CONVERSION, ELECTROCHEMISTRY), (*BATTERY COMPONENTS, AMMONIA), (*AMMONIA, ENERGY CONVERSION), ELECTRODES, LEAD(METAL), LEAD COMPOUNDS, CHLORIDES, OXIDATION REDUCTION REACTIONS, AMMONIUM COMPOUNDS, CARBONATES, ELECTROLYTES, LITHIUM, MAGNESIUM, SOLVENTS, (U)SOLVENTS (U) IDENTIFIERS: AMMONIUM BICARBONATE, AMMONIA-ACTIVATED BATTERIES, LEAD CHLORIDE (U)

Reference electrodes based on metallic lead and lead compounds were investigated. Using the Pb/Pb(++) (sat'd. lead nitrate) electrode as a standard (zero potential), then for Pb/PbCl2-Cl(-), E = 25 mv; for Pb treated with water (empirical oxide coating) E = 190 mv; for bare clean Pb, E > 200 mv. The redox potentials of new types of solutes (such as ammonium carbonate and bicarbonate) were studied with a chronopotentiometric technique, their limiting parameters determined, and the results related to observations in voltaic-cell tests. Results of tests on cells in which conventional electrolytes were eliminated (and in which their function of providing electrolytic conduction was supplied by the solution of cathode material in the liquid ammonia) indicated the feasibility of such cells for hardware applications. Inherently, these cells (consisting of a sheet metal anode, one electrolyte-cathode pad, and a sheet metal cathetron) may be classified as thin cells. The electrolyte solution-activation method was evaluated in a statistically designed experiment. The results were that (1) the Li cells had higher (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 619 379

GENERAL ELECTRIC CO PLEASANTON CALIF SPECIAL PURPOSE
NUCLEAR SYSTEMS OPERATION

RESEARCH AND DEVELOPMENT OF THERMIONIC CONVERSION OF
HEAT TO ELECTRICITY. (U)

DESCRIPTIVE NOTE: Quarterly letter rept. no. 4, 30 Mar
64-29 Jun 65.

JUN 65 7P

CONTRACT: N06s90496

PROJ: SR007 12 01 .ARPA Order 219

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-455 803.

DESCRIPTORS: (*ENERGY CONVERSION, THERMIONIC
CONVERTERS), (*THERMIONIC CONVERTERS, ELECTRIC POWER
PRODUCTION), (*NUCLEAR POWER PLANTS, ENERGY CONVERSION),
REACTOR FUELS, URANIUM COMPOUNDS, OXIDES, URANIUM,
DIFFUSION, TUNGSTEN, MOLYBDENUM, REACTOR FUEL CLADDING,
OXYGEN, ALUMINUM COMPOUNDS, NIOBIUM, REACTION KINETICS,
SEALS(STOPPERS), CERMEITS, BONDING, WELDS, CERAMIC
MATERIALS, LIFE EXPECTANCY (U)

Progress is reported on the development of a
nuclear thermionic electrical generating system for
the Department of the Navy. Work is being
performed to develop the materials capabilities which
are essential for this nuclear thermionic system.
This work consists of three major tasks. They
are: U02 - refractory metal reaction kinetics,
insulator materials development, ceramic-to-metal seal
development. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 618 470

RADIO CORP OF AMERICA CAMDEN N J

A STUDY OF LOW-OUTPUT-VOLTAGE CONVERSION AND
REGULATION TECHNIQUES. (U)

DESCRIPTIVE NOTE: Final rept.,

JUN 65 68P Kisko, R. ;Needs, W. ;

REPT. NO. CR-65-595-1

CONTRACT: AF3C 602 3518

PROJ: 4519

TASK: 451901

MONITOR: RADC , TR-65-126

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*POWER SUPPLIES, DIRECT CURRENT), (*ENERGY
CONVERSION, FEASIBILITY STUDIES), (*DIRECT CURRENT,
ENERGY CONVERSION), REVIEWS, TRANSISTORS, RECTIFIERS,
HALL EFFECT, GENERATORS, VOLTAGE, TUNNEL DIODES,
CIRCUITS, REDUCTION, VOLTAGE REGULATORS (U)

The report describes the results of a study
conducted to determine the state of the art of DC
bias power supplies with high regulation and
fractional output voltages. The availability of
fractional-output-voltage power supplies was
determined by a survey of literature and a canvass of
power supply manufacturers. The effort revealed
that none was available. A study was then
undertaken to determine the feasibility of producing
such devices with high output current and high
efficiency. Three methods were studied: the
transistor-rectifier technique, the transformed-diode
technique, and the use of unconventional generators
based on the Hall effect. The results indicate
that the first method is completely feasible, the
second is completely infeasible, and the third has
potential, but requires further investigation.
(Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 618 071

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no.

7, 1 Mar-31 May 65,

JUN 65 36P

Kerrebrock, J. L.; Jackson, W. D.; Brown, G. A.;

CONTRACT: AF33 615 1083

PROJ: 8173

TASK: 817306

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS),
 (*MAGNETOHYDRODYNAMICS, POWER SUPPLIES), (*THERMIONIC
 CONVERTERS, MATERIALS), GENERATORS, LIQUID METALS,
 ALKALI METALS, ELECTRIC PROPULSION, THERMIONIC EMISSION,
 TRANSPORT PROPERTIES, JET PUMPS, TURBULENCE, FLUID
 MECHANICS (U)

Contents: Magnetohydrodynamic power generation
 with liquid metals; Liquid-metal
 magnetohydrodynamic generators; Magnetohydrodynamic
 channel flow; Systems with alkali-metal vapor
 generators; Thermionic emission from a tungsten
 crystal; Bonding mechanism of alkali-metal atoms
 adsorbed on metal surfaces; Volume ionization
 mechanisms in thermionic diodes; Condensing ejector
 test facility; Boundary-layer analysis of turbulent
 magnetohydrodynamic channel flows; Preliminary
 experimental results on an MHD induction generator;
 Thermionic characteristics of the (110) and
 (112) directions of tungsten in cesium vapor. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 618 037

MINNESOTA MINING AND MFG CO ST PAUL

300 WATT PORTABLE THERMOELECTRIC GENERATOR. (U)

DESCRIPTIVE NOTE: Monthly progress rept. no. 9, for period
 ending Jun 65.

JUN 65

5P Carlton, R. D.;

CONTRACT: N600 61533 62758

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-612 602.

DESCRIPTORS: (*THERMOELECTRICITY, POWER SUPPLIES),
 (*GENERATORS, THERMOELECTRICITY), (*ELECTRIC POWER
 PRODUCTION, THERMOELECTRICITY), PORTABLE EQUIPMENT,
 THERMOCOUPLES, PERFORMANCE(ENGINEERING), HEAT
 EXCHANGERS, HEAT CONVERSION (U)
 IDENTIFIERS: THERMOELECTRIC POWER GENERATION (U)

Over 1000 hours of stable performance has been
 accumulated on a 5-couple test module. A 9-couple
 module has verified the predicted electrical and
 thermal performance of the thermopile design. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 618 016

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

TEN TIMES MORE POWERFUL THAN THE 'ROMASHKA', (U)

JUL 65 6P Berezhnoi, Yu. ;

REPT. NO. FTD-11-65-758

MONITOR: TT, 65-62628

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Unedited rough draft trans. from an unidentified 1964 or 1965 issue of Sovetskaya Rossiya (USSR).

DESCRIPTORS: (*THERMAL BATTERIES, ENERGY CONVERSION), (*ENERGY CONVERSION, THERMAL BATTERIES), SEMICONDUCTORS, THERMOCOUPLES, THERMOELECTRICITY, ELECTRIC POWER PRODUCTION, HEAT, USSR (U)

Translation of Russian article: New developments in thermoelectrical generators.

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DDC-REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 617 603

RADIO CORP OF AMERICA HARRISON N J ELECTRONIC COMPONENTS AND DEVICES

100 WATT THERMOELECTRIC GENERATOR. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 3, 1 Jan-31 Mar 65,

APR 65

Van Heyst, H. P. ; Schade, O. H.

, Jr. ;

CONTRACT: DA28 043AMC00265E

PROJ: 1F6 41209D535

TASK: 1E6 41209D535 12

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMOELECTRICITY, GENERATORS), (*GENERATORS, THERMOELECTRICITY), THERMOCOUPLES, HEATERS, HEAT TRANSFER, ENERGY CONVERSION, GASOLINE, VOLTAGE REGULATORS, HEAT EXCHANGES, DESIGN, LIFE EXPECTANCY, STARTING, PERFORMANCE(ENGINEERING) (U)
IDENTIFIERS: THERMOELECTRIC POWER GENERATION (U)

A number of modifications were made on the thermoelectric couple design. These modifications were prompted by the module power output performance obtained during the last quarter. A number of modules incorporating the previous design were operated for extended periods under open circuit and matched load conditions, design operating temperatures and overshoot temperatures. The performance of these modules was reliable at the required operating conditions. The burner radiant construction has been established and has been found to be a good compromise between heat transferring ability, desired flux distribution and service life. No major difficulties were encountered when the exhaust duct, vaporizer heat-exchanger, gasoline burner and thermoelectric converter were operational tested. These limited operational tests have shown that the burner combusts leaded gasoline in accordance with all design requirements. In the area of auxiliary component and control devices, the shunt voltage regulator is essentially the same as that described last month except that the base connection of the gate transistor is brought to a rotary switch at the generator instrument panel where one of four regulated outputs may be selected. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 617 132

NAVAL RESEARCH LAB WASHINGTON D C

DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS. (U)

DESCRIPTIVE NOTE: Bibliography no. 9,
JUN 65 119P Pickenbaugh, Eileen ;
REPT. NO. NRL-Bib-9

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, BIBLIOGRAPHIES),
(*BIBLIOGRAPHIES, ENERGY CONVERSION), THERMOELECTRICITY,
THERMIONIC EMISSION, PHOTOELECTRIC EFFECT,
ELECTROCHEMISTRY, MAGNETOHYDRODYNAMICS, ENERGY,
ABSTRACTING (U)

This is the ninth in a series of bibliographies covering unclassified literature related to the direct conversion of energy. Subject coverage includes thermoelectricity, thermionic emission, photoelectric processes, magnetohydrodynamics, electrochemical processes, energy storage, and energy sources. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 616 764

MINNESOTA MINING AND MFG CO ST PAUL

300 WATT PORTABLE THERMOELECTRIC GENERATOR. (U)

DESCRIPTIVE NOTE: Monthly progress rept. no. 8 for period
ending 31 May 65,
MAY 65 6P G. R. D. ;
CONTRACT: N600 61533 62752

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-612 602.

DESCRIPTORS: (*THERMOELECTRICITY, POWER SUPPLIES),
(*GENERATORS, THERMOELECTRICITY), (*ELECTRIC POWER
PRODUCTION, THERMOELECTRICITY), PORTABLE EQUIPMENT,
THERMOCOUPLES, ENERGY CONVERSION, LIFE EXPECTANCY, HEAT
TRANSFER, VOLTAGE REGULATORS (U)

Two 5 couple modules were constructed and put on life test. A 9-couple module of the design which will be used in the generator was constructed and tested. Thermal experiments on cold-end heat transfer were completed and couple hardware design was finalized. A prototype voltage regulator was built and tested. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 616 549

NAVAL ORDNANCE LAB CORONA CALIF

CHEMOELECTRIC ENERGY CONVERSION FOR NONAQUEOUS
RESERVE BATTERIES.

(U)

DESCRIPTIVE NOTE: Quarterly rept. no. 7, Jan-Mar 65,
APR 65 54P Panzer, R. E.; Harris, W. S.;
Daley, J. C.; McWilliams, G. E.; Spindler, W. C.

TASK: RRE06 017 211 1F009 06 05.R360FR104 211
1R011 01 01

MONITOR: NAVNEPS , 8813

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, ELECTROCHEMISTRY),
(*BATTERY COMPONENTS, AMMONIA), OXIDIZERS, ELECTROLYTES,
ELECTRICAL CONDUCTIVITY, VOLTAGE, POWER, (U)POWER (U)

progress for the quarter is reported on the
following projects: Nonaqueous Solvent
Electrochemistry; Electroreduction of Organic
Cathode Materials in Liquid Ammonia
Solutions; Ammonia Cell Exploratory
Development; and Analysis and Evaluation of
Experiments. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 616 336

GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE
DIVSTRUCTURAL RESPONSE TO INTENSE ELECTROMAGNETIC
RADIATION.

(U)

DESCRIPTIVE NOTE: Final rept. for 1 Mar 61-28 Feb 65,
JUN 65 196P Good, R. C., Jr.;

REPT. NO. R65SD25

CONTRACT: AF49 638 1030

PROJ: 9782

TASK: 37718

MONITOR: AFOSR , 65-0988

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, ELECTROMAGNETIC
RADIATION), (*EXCITING WIRES, ENERGY CONVERSION),
(*ELECTROMAGNETIC RADIATION, ENERGY CONVERSION),
(*GLASS, ELECTROMAGNETIC RADIATION), (*DAMAGE,
ELECTROMAGNETIC RADIATION), PLASTICS, PLASMAS(PHYSICS),
STRESSES, THERMAL STRESSES, INSTRUMENTATION, ELECTRICAL
RESISTANCE, ELECTRIC DISCHARGES, THERMOCOUPLES,
MATHEMATICAL ANALYSIS, (U)MATHEMATICAL ANALYSIS (U)

An exploding wire apparatus was used to study
conversion of electrical energy into strain energy in
glass, plastic, and metal samples that had been
either irradiated by the electromagnetic waves
emitted by the wire or enveloped by plasma formed by
the wire. The strain energy left permanent marks
on the sample in the form of discoloration, weight
loss, erosion, and surface cracks. These were used
to confirm the theoretical analysis as to method and
to dimensions. Thus, a new method for measuring
absorption coefficients was demonstrated. For
glass samples, the surface crazed to a depth of 0.001
cm. Photomicrographs and profilometer measurements
of the surface are presented to support the following
conjectures as to the cause of cracking: the
energy radiation by the hot wire is absorbed by a
thin surface layer of the glass, the associated
temperature rise generates thermal stresses, flaws
below the glass surface form stress raisers according
to the Griffith crack theory, and the cracks
subsequently propagate to the surface.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 616 310

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

LOW-TEMPERATURE PLASMA GENERATORS.

MAY 65 11P Khristianovich, S. A. ; Zhukov,

M. Yu. ;

REPT. NO. FTD-TT-65-63

MONITOR: TT. 65-62443

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Unedited rough draft trans. of Akademiya Nauk SSSR. Vestnik, v34 n6 p21-5 1964. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

DESCRIPTORS: (*PLASMA MEDIUM, GENERATORS), (*ENERGY CONVERSION, PLASMA MEDIUM), USSR

Translation of Russian research: Low-temperature plasma generators.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 615 124

MALAKER LABS INC HIGH BRIDGE N J

KINETIC STUDY OF ROCKET EXHAUST GASES.

DESCRIPTIVE NOTE: Final rept. for period ending 30 Apr 65.

APR 65 49P

REPT. NO. 103-12

CONTRACT: DA30 069ORD2918

PROJ: 1A22901A211

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is not available for public use.

DESCRIPTORS: (*ROCKET PROPELLANTS, COMBUSTION PRODUCTS), (*EXHAUST GASES, DYNAMICS), (*ENERGY CONVERSION, EXHAUST GASES), (*COMBUSTION PRODUCTS, TEST METHODS), ELECTRIC POWER PRODUCTION, GAS IONIZATION, PLASMA MEDIUM, ADDITIVES, BURNING RATE, TEST EQUIPMENT, OPTICAL EQUIPMENT, FLAMES, TEMPERATURE, PHOTOMETERS

(U)

The initial objective of this program was to investigate the feasibility of devices for extraction of electrical energy from rocket engine exhaust streams. An extensive literature search was conducted, a comprehensive bibliography prepared (published in PB-153 966) and an analytic study performed based on a physical model deduced from the most accurate experimental evidence available. Subsequently, a study of the subtle changes induced in the solid propellant combustion process by introduction of additives was undertaken. These additives, in general, modify the burning rates of propellant material. Various optical diagnostic techniques were employed to identify species concentration by flame zones and to obtain localized temperatures and total visible radiation values with good time resolution. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 614 947

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

PACIFICATION OF FIRE.

(U)

APR 65 7P Golovachev, V. ;

REPT. NO. FTD-11-64-1107

MONITOR: TT. 65-62136

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Unedited rough draft trans. from Pravda, Moscow (USSR) p4 Jul 17 1962.

DESCRIPTORS: (=PLASMA ENGINES, ENERGY CONVERSION), (=ENERGY CONVERSION, PLASMA ENGINES), MAGNETOHYDRODYNAMICS, USSR

(U)

The development of plasma engines in the Soviet Union is briefly reviewed.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 614 907

CURTISS-WRIGHT CORP WOOD-RIDGE N J WRIGHT AERONAUTICAL DIV

A CONTINUATION OF THE BASIC STUDY OF SLENDER CHANNEL ELECTROGASDYNAMICS.

(U)

DESCRIPTIVE NOTE: Final rept. for Feb 63-Aug 64,

JAN 65 97P Kahn, Bernard ;

CONTRACT: AF37 657 10892

PROJ: 7116

TASK: 711602

MONITOR: ARL. 65-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (=ELECTRIC POWER PRODUCTION, PLASMA MEDIUM), (=ENERGY CONVERSION, PLASMAS(PHYSICS)), (=PLASMA MEDIUM, ENERGY CONVERSION), GENERATORS, IONS, ELECTRIC FIELDS, COLLOIDS, AEROSOLS, PARTICLE SIZE, DENSITY, TEST METHODS, NOZZLES, GAS DISCHARGES, ION SOURCES, GAS FLOW

(U)

IDENTIFIERS: ELECTROHYDRODYNAMIC GENERATORS

(U)

The report covers the continuation of power generation studies involving electrogasdynamic energy conversion (See also AD-427 967). The continuation of these studies involves a detailed experimental and analytical program investigating the phenomenon of generating electric power by causing a supply of unipolar ions to be forced to flow against an opposing induced electric field in an energy conversion channel. The analytical program includes studies on the mobility of charged aerosol particles, the performance of electrogasdynamic generators, and optical methods to determine particle size and number density in a steady flow. Experimental investigations include the measurement of mobility, the examination of the EGD interaction using colloidal ions, attempts to measure pressure drops due to friction and electrical body forces and electrical field distribution. The advantage of designing converters in which the length is considerably greater than the diameter is explored further, with the conclusion that electrical forces must act on the charged particles over a distance that remains compatible with limitations due to electrical breakdown and particle deposition.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 614 285

ADVANCED KINETICS INC COSTA MESA CALIF

PLASMA KINETIC ENERGY - RF CONVERSION. (U)

DESCRIPTIVE NOTE: Final rept.

FEB 65 128P

CONTRACT: AF30 602 2981

PROJ: 5573

TASK: 557303

MONITOR: RADC TR-64-550

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

DESCRIPTORS: (-RADIOFREQUENCY POWER, PLASMAS(PHYSICS)), (-OSCILLATION, ENERGY CONVERSION), (-ENERGY CONVERSION, PLASMAS(PHYSICS)), X BAND, K BAND, ELECTROMAGNETIC RADIATION, ELECTROMAGNETIC PULSES, CYCLOTRON RESONANCE PHENOMENA, MAGNETIC FIELDS, ELECTRIC FIELDS, ELECTRON ACCELERATORS, X RAYS, MEASUREMENTS, CYCLOTRON WAVES, MICROWAVES. (U)MICROWAVES (U)

The effort was an extension of an experimental and theoretical investigation of microwave energy produced by cyclotron radiation from a plasma medium. Power densities several orders of magnitude higher than had been obtained previously by any investigator were experimentally measured. Power densities of hundreds of watts per cubic centimeter of X-band power were produced in the form of 100-500 nanosecond pulses. These high power densities indicate some ordering or coherency mechanism in this interaction. If this coherency can be enhanced and if this proves to be a true volume instead of surface interaction, this effort could result in microwave generators which are capable of producing power outputs far beyond any of those available from present generators. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 614 023

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

EARTHLY SUN OBEY. (U)

MAP 65 5P

REPT. NO. FTD-TT-64-1326

MONITOR: TT, 65-61995

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Unedited rough draft trans. from Izvestiya (USSR) n271 p 5 Nov 13 1964.

DESCRIPTORS: (-NUCLEAR PHYSICS, POWER SUPPLIES), (-MAGNETOHYDRODYNAMICS, ENERGY CONVERSION), LASERS, PLASMAS(PHYSICS), NUCLEAR REACTIONS, CONTROL, USSR (U)

A popularized Russian newspaper article on the progress of controlled nuclear reactions as a power source is presented. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 613 911

AVCO CORP WILMINGTON MASS RESEARCH AND ADVANCED
DEVELOPMENT DIV

MAGNETOCALORIC POWER.

(U)

DESCRIPTIVE NOTE: Revised ed.,

MAY 64

5P

Resler, E. L., Jr.; Rosensweig,

R. E.;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in AIAA Journal (U. S.) v2 n8
p1418-22 Aug 1964 (Copies not available to DDC or
Clearinghouse customers). Revision of manuscript
submitted 19 Nov 63.

DESCRIPTORS: (*ENERGY CONVERSION, THERMODYNAMIC CYCLES),
(*POWER SUPPLIES, HEAT ENGINES), (*HEAT ENGINES, POWER
SUPPLIES), MAGNETIC FIELDS, FERROMAGNETIC MATERIALS,
THERMODYNAMICS, PLASMAS(PHYSICS), PERFORMANCE
(ENGINEERING) (U)

The work treats the subject of power produced by
cycling a ferromagnetic material thermally through a
range of temperatures such that its magnetization
changes appreciably and of utilizing the change of
magnetization and its interaction with a magnetic
field. Thermodynamically, an appropriate cycle to
make this form of power practical is evaluated,
physical circumstances to realize the cycle are
discussed, and losses are estimated. In taking a
broader view than previous work, it is found that
potentially competitive heat engines based on
magnetocaloric devices are possible, provided that
the primary heat energy is first converted into
mechanical form and that a regenerative cycle is
used. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 613 358

NAVAL RESEARCH LAB WASHINGTON D C

DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS.

(U)

DEC 64 139P

REPT. NO. NRL-BIB-8

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-601 224.

DESCRIPTORS: (*ENERGY CONVERSION, BIBLIOGRAPHIES),
(*BIBLIOGRAPHIES, ENERGY CONVERSION), ABSTRACTING,
THERMOELECTRICITY, THERMIONIC EMISSION, PHOTOELECTRIC
EFFECT, ELECTROCHEMISTRY, MAGNETOHYDRODYNAMICS, ENERGY (U)

A collection of references from various sources
covering the current literature on thermoelectricity,
thermionic emission, photoelectric processes,
magneto hydrodynamics, electrochemical processes,
energy storage, and energy sources. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 612 710

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no. 6. 1 Dec 64-28 Feb 65.

MAR 65 34P Jackson, William D.; Brown, George A.; Kerrebrock, Jack L.; Stickney, Robert E.

CONTRACT: AF33 615 1083

PROJ: 8173

TASK: 817306

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-610 673.

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), (*MAGNETOHYDRODYNAMICS, POWER SUPPLIES), (*THERMIONIC CONVERTERS, MATERIALS), LAMINAR FLOW, INDUCTION SYSTEMS, POTASSIUM, ELECTRICAL CONDUCTIVITY, VAPORS, THERMIONIC EMISSION, HALL EFFECT, ALKALI METALS, GENERATORS, ADSORPTION, CHEMICAL BONDS (U)

Contents: Magnetohydrodynamic induction machine with laminar fluid flow; Behavior of dry potassium vapor in electric and magnetic fields; Bonding mechanism of alkali metal atoms adsorbed on metal surfaces. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 612 602

MINNESOTA MINING AND MFG CO ST PAUL

300 WATT PORTABLE THERMOELECTRIC GENERATOR, (U)

DESCRIPTIVE NOTE: Monthly progress rept. no. 5 for period ending 28 Feb 65, FEB 65 5P Carlton, R. D.;

CONTRACT: N600 61533 62758

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-611 398.

DESCRIPTORS: (*THERMOELECTRICITY, POWER SUPPLIES), (*GENERATORS, THERMOELECTRICITY), (*ELECTRIC POWER PRODUCTION, THERMOELECTRICITY), PORTABLE EQUIPMENT, THERMOCOUPLES, FUELS, HEAT EXCHANGERS, ENERGY CONVERSION, COOLING, VOLTAGE REGULATORS, CIRCUITS, DESIGN, WIRING DIAGRAMS (U)

Detail and assembly drawings for the generator were completed. A modification of the burner resulted in a heat flux of 41 watts/sq in at an efficiency of 65.5%. Test fixtures for the thermoelectric couples are being fabricated. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 612 124

ARKANSAS UNIV FAYETTEVILLE PLASMA LAB

RESEARCH ON THE INTERACTIONS OF PLASMA FLOW AND
MAGNETIC FIELDS.

(U)

DESCRIPTIVE NOTE: Quarterly progress rept. for 15 May-15
AUG 64.

AUG 64 16P

REPT. NO. UAPL-19

CONTRACT: DA23 072AMC168Z

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-447 800.

DESCRIPTORS: (*PLASMA JETS, MAGNETIC FIELDS),
(*MAGNETOHYDRODYNAMICS, GENERATORS), (*ENERGY
CONVERSION, MAGNETOHYDRODYNAMICS), PLASMA MEDIUM,
INDUCTANCE, ELECTRICAL CONDUCTIVITY, GAS DISCHARGES,
VELOCITY, HEAT TRANSFER, ELECTRODES, COOLING, REENTRY
VEHICLES, POWER SUPPLIES (U)

Topics include: status of equipment; theoretical
studies of plasma interaction with a magnetic field;
theoretical and experimental studies of plasma
electrical conductivity; jet velocity measurements;
heat transfer measurements; wear-out of electrodes;
evaluation of AC magnetohydrodynamic generator for
re-entry. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 610 708

NAVAL ORDNANCE LAB CORONA CALIF

CHEMOELECTRIC ENERGY CONVERSION FOR NONAQUEOUS
RESERVE BATTERY SYSTEMS.

(U)

DESCRIPTIVE NOTE: Quarterly rept. for Oct-Dec 64.

JAN 65 36P

TASK: RR06 017 211 1F009 06 05

MONITOR: NAVWEPS , 8229

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, ELECTROCHEMISTRY),
(*BATTERIES AND COMPONENTS, ELECTROCHEMISTRY),
(*ELECTROLYTIC CELLS, ELECTROCHEMISTRY), POTASSIUM
COMPOUNDS, SODIUM COMPOUNDS, AMMONIUM COMPOUNDS,
SALFATES, THIOCYANATES, ELECTRICAL CONDUCTIVITY, HALOGEN
COMPOUNDS, LITHIUM ALLOYS, NITROBENZENES, AMMONIA
IDENTIFIERS: AMMONIA-ACTIVATED BATTERIES (U)

During the quarter a new cell fixture was placed in
service to measure conductivities of liquid ammonia
and solutions of salts in liquid ammonia. The cell
fixture was used in different configurations for
initial studies of voltaic cells having a 'pill' type
construction; the conductivities of cell pills were
also determined. Modification of the cell-fixture
construction was accomplished to permit voltammetric
studies in this environment. It was found that
(NH4)2SO4 is unsuitable as an insoluble acid
catholyte when using m-dinitrobenzene as the active
cathode material. It is believed that the rate of
solution of the acid is too slow and that this is the
cause of poor performance at high current. The
study of cation effect showed that the zinc ion has a
serious detrimental effect on cathodic performance
even when excess acid is present in the cell. For
cells tested in the research single-cell test
fixture, the thickness of the electrolyte pad was
reduced to 1/3 mm without apparent degradation. A
number of positive halogen compounds screened for
use as cathodes in the ammonia system reacted
violently with ammonia gas and with electrolyte
solutions. Two of the eight compounds show slight
promise. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 610 673

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no.

5, 1 Sep-30 Nov 64,

DEC 64 24P

Jackson, William D. ;Brown,

George A. ;Kennebrock, Jack L.;Stickney, Robert

E. ;

CONTRACT: AF33 615 1083

PROJ: 8173

TASK: 817306

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-607 784.

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), (*MAGNETOHYDRODYNAMICS, POWER SUPPLIES), (*THERMIONIC CONVERTERS, MATERIALS), GENERATORS, LIQUID METALS, ALKALI METALS, PROPULSION SYSTEMS, VAPORIZATION, CESIUM, THERMODYNAMICS, THERMIONIC EMISSION, TUNGSTEN, THERMAL PROPERTIES, FLUID MECHANICS, TRANSPORT PROPERTIES (U)

Research progress in the following areas is reported: (1) magnetohydrodynamic power generation with liquid metals, (2) magnetohydrodynamic induction generator, (3) alkali-metal generators, (4) thermionic energy conversion. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 610 240

AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

AN INVESTIGATION OF THE WALL-STABILIZED, TRANSPIRATION-COOLED DC ELECTRIC ARC. (U)

DESCRIPTIVE NOTE: Master's thesis,

JUN 64 118P

Jones, Ralph Noble ;

REPT. NO. GAW/Mech-64-11

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ELECTRIC ARCS, ENERGY CONVERSION), (*ENERGY CONVERSION, ELECTRIC ARCS), (*HEATERS, ELECTRIC ARCS), ENTHALPY, THEORY, MATHEMATICAL MODELS, ELECTRIC FIELDS, POWER SUPPLIES, ELECTRIC PROPULSION, GAS FLOW, COOLING, NITROGEN, ARGON, SPACE PROPULSION, PLASMAS(PHYSICS), PROGRAMMING (COMPUTERS), MATHEMATICAL PREDICTION (U)
IDENTIFIERS: FORTRAN (U)

An extension of previous investigations of a wallstabilized, transpiration-cooled DC electric arc plasma generator was made. Numerical solutions for the energy exchange in the arc were obtained, and an extended theoretical model for the energy exchange was proposed. Measurements of radiative power losses indicated that use of the extended model may be necessary for accurate quantitative analysis, particularly in predicting the radiative losses. Investigation of an unusual spatial electric field strength fluctuation in the arc indicated that experimental error probably did not account for the observation. The latter assertion is upheld by other experiments performed on similar devices at the University of Minnesota. Spatially nonuniform gas-injection patterns were found to improve the energy-conversion efficiency of the device. Means of further increasing the efficiency, and of extending the theoretical analysis of the device, are proposed. (Author) (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 610 176

AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO
PERFORMANCE AND FLUID FLOW CHARACTERISTICS OF AN
ELECTRO-FLUID DYNAMIC GENERATOR.

(U)

DESCRIPTIVE NOTE: Master's thesis,
AUG 64 106P Roland, Jay Roy ;
REPT. NO. GA/ME/64-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ELECTRIC POWER PRODUCTION,
MAGNETOHYDRODYNAMICS), (*MAGNETOHYDRODYNAMICS,
GENERATORS), (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS),
FLUID FLOW, ELECTRIC FIELDS, GAS IONIZATION, FLUID
DYNAMICS, FLUID MECHANICS, CHARGED PARTICLES, BOUNDARY
LAYER, LOADING (MECHANICS), INSTRUMENTATION, PRESSURE,
VOLTAGE, PERFORMANCE (ENGINEERING), IONS, TESTS (U)
IDENTIFIERS: ELECTROHYDRODYNAMIC GENERATORS (U)

An investigation was conducted on performance and fluid flow characteristics of an EFD (electro-fluid dynamic) generator in order to experimentally determine the performance of an EFD generator using two different ground plate inserts under various conditions. The generator consisted of a closed loop pressurized system with an ejector powered secondary flow. An ion production system produced a locally intense electric field which partially ionized a high velocity neutral gas. The ions were carried through a conversion duct against a potential gradient, and were then collected and neutralized. Because the electric field from the collector opposed the motion of the ions, fluid dynamic energy was converted into electrical energy. In Phase I of this study, four configurations were tested under various conditions in order to determine the best geometric configuration, to check needle currents, and to measure performance. In Phase II a modified conversion duct was used to measure total pressure profiles and static pressure at four stations along the duct. Results showed that the normal ground plate insert gave better performance because of higher needle currents, and that the primary to secondary pressure ratio of three did not yield maximum needle current, as a pressure ratio of four gave a definite increase. (Author)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 610 104

GENERAL ELECTRIC CO WEST LYNN MASS

INVESTIGATION OF POWER SOURCES FOR MANPACK
EQUIPMENT.

(U)

DESCRIPTIVE NOTE: Final technical rept. for 24 Feb-24
Aug 64,
DEC 64 201P Hovious, Thomas C. ;
CONTRACT: AF3C 602 3356
PROJ: 5592
TASK: 559203
MONITOR: RADC , TDR64 412

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*POWER SUPPLIES, PORTABLE EQUIPMENT),
(*ENERGY CONVERSION, PORTABLE EQUIPMENT), STORAGE
BATTERIES, POWER SUPPLIES, FUEL CELLS, THERMIONIC
CONVERTERS, MOTOR GENERATORS, FERROELECTRICITY,
THERMOELECTRICITY, GENERATORS, WEIGHT, EFFECTIVENESS,
COMMUNICATION EQUIPMENT, PERFORMANCE (ENGINEERING),
MILITARY REQUIREMENTS (U)

This study was performed to determine the most optimum energy conversion technique for a man-pack power source in the power levels of 10, 25, and 100 watts. These power levels were investigated at two separate energy demand rates of one to nine duty cycle and a one to one duty cycle. The most critical requirements in this effort were weight and volume. The power sources were allowed 4, 15, and 25 pounds respectively and a volume which could be integrated with the communications equipment on a standard military back-pack board. The results of this engineering investigation indicate that batteries of the AgZnO variety appear to be best for all power levels at the one to nine duty cycle. The fuel cells are inherently lighter systems in the 10 and 25 watt design one to one duty cycle but it is not conclusive that they are superior to thermoelectrics in the 100 watt, one to one duty cycle. In the 100 watt size all pertinent criteria must be weighted and evaluated prior to a final choice. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 609 966

RADIO CORP OF AMERICA LANCASTER PA

THE DEVELOPMENT OF A LOW-TEMPERATURE CYLINDRICAL THERMIONIC GENERATOR. (U)

DESCRIPTIVE NOTE: Quarterly technical rept. no. 3.

DEC 64 50P
CONTRACT: AF33 615 1547
PROJ: 8173
TASK: 817305 9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Continuation of Contract AF33 616 7903. See also AD-607 086.

DESCRIPTORS: (*THERMIONIC CONVERTERS, DESIGN), (*ENERGY CONVERSION, THERMIONIC CONVERTERS), ELECTRIC POWER PRODUCTION, POWER EQUIPMENT, HEATERS, LIQUID METALS, SEALS (STOPPERS), TESTS, LIFE EXPECTANCY, INJECTION, GASES, MATERIALS, MOLYBDENUM, NICKEL, CESIUM COMPOUNDS, FLUORIDES, SULFATES, TUNGSTEN COMPOUNDS, OXIDES, IRIIDIUM, PALLADIUM, NIOBIUM, CERAMIC MATERIALS, THERMAL RADIATION, ALUMINUM COMPOUNDS (U)

The evaluation and analysis of Type A-11988 insulated converters provided additional evidence that the A-11988 is a reliable, long-life design, and that the cast alumina layer is an effective insulator. Four improved Type A-1274A Modules, Serial Numbers 2 through 5, were fabricated. The improved reliability of the module was demonstrated in calibration tests of Module Serial No. 4, when more than 240 hours of operating time was accumulated over a wide range of operating conditions. Tests showed that although the A-1274A is capable of full design performance, additional collector cooling is required. Consequently, the radiation heat rejection system for Module Serial No. 5 was redesigned. Tests with the gas dosing injection system indicated the need for more accurate gas injection, and the system was subsequently modified. Collectors of cesium fluoride, cesium sulphate, tungsten trioxide, iridium matrix, and palladium matrix were tested in type A-1194E converters in the low-work function collector investigation. Results were unsatisfactory. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 609 417

STANFORD UNIV CALIF

DIRECT ENERGY CONVERSION SYSTEMS. SUPPLEMENT 2. TRANSPORT PROPERTIES OF PARTIALLY IONIZED MONATOMIC GASES. (U)

DESCRIPTIVE NOTE: Quarterly technical summary rept. no. 4, Suppl. 2, 1 Jun - 31 Aug 64,
SEP 64 66P
CONTRACT: AF49 638 1123
PROJ: ARPA Order 246

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-609 415, AD-609 416.

DESCRIPTORS: (*ENERGY CONVERSION, SCIENTIFIC RESEARCH), (*TRANSPORT PROPERTIES, PLASMA MEDIUM), (*PLASMA MEDIUM, TRANSPORT PROPERTIES), (*GASES TRANSPORT PROPERTIES), THERMAL CONDUCTIVITY, THERMAL DIFFUSION, VISCOSITY, ELECTRIC-L PROPERTIES, MATHEMATICAL ANALYSIS, SPECIAL FUNCTIONS (MATHEMATICS), QUANTUM THEORY, STATISTICAL FUNCTIONS, DETERMINANTS(MATHEMATICS), INTEGRALS, SERIES(MATHEMATICS), MATRICES(MATHEMATICS) (U)
IDENTIFIERS: GASES (U)

This report is concerned with special problems which arise in connection with calculations of the transport properties of partially ionized monatomic gases. The most serious problem concerns the lack of agreement of the usual thermal conductivity expression in the limit of full ionization with other results derived explicitly for this case. It is shown that satisfactory agreement can be obtained in this limit if one uses the third rather than the second approximation in the Chapman-Enskog theory. Expressions for the fourth and lower approximations to the thermal conductivity, the thermal diffusion coefficient, and the ordinary diffusion coefficient of multicomponent gases are derived. The viscosity of this mixture is considered to the second approximation. It is shown that the thermal diffusion plays a very important role in an ionized gas. Neglect of this effect can cause the thermal conductivity to be seriously overestimated. An expression is presented which approximates the effect of the thermal diffusion on the thermal conductivity. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 609 416
STANFORD UNIV CALIF

DIRECT ENERGY CONVERSION SYSTEMS. SUPPLEMENT 1. HEAT AND MASS TRANSFER FROM THE SURFACE OF A CYLINDER WITH DISCONTINUOUS BOUNDARY CONDITIONS TO AN INCOMPRESSIBLE LAMINAR FLOW. (U)

DESCRIPTIVE NOTE: Quarterly technical summary rept. no. 4, suppl. 1, 1 Jun - 31 Aug 64, SEP 64 71P Rotem, Zeev ; mason, David M. ; CONTRACT: AF49 638 1123 PROJ: ARPA Order 246

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Legibility of this document is in part unsatisfactory. Reproduction has been made from the best available copy. See also AD-609 415.

DESCRIPTORS: (*ENERGY CONVERSION, SCIENTIFIC RESEARCH), (*TRANSPORT PROPERTIES, FLUID FLOW), (*FLUID FLOW, CYLINDRICAL BODIES), (*TWO DIMENSIONAL FLOW, HEAT TRANSFER), SURFACES, INCOMPRESSIBLE FLOW, LAMINAR FLOW, BOUNDARY LAYER, SHEAR-STRESSES, THEORY, EXPERIMENTAL DATA, MATHEMATICAL ANALYSIS, BOUNDARY VALUE PROBLEMS, THERMAL CONDUCTIVITY, TEST EQUIPMENT, ELECTROCHEMISTRY, ELECTRODES (U)

Heat and mass transfer studies for flow over a cylinder having a longitudinal-strip source of heat or mass, are presented. A theory for the two asymptotic cases of Pr approaches infinity and Pr approaches 0 is developed, giving the temperature profile and the transfer rate for such a strip. The theory includes the effect of the conductivity of the heating strip material. It is shown that if the conductivity of the strip material is very high, then the transfer rate is a measure of local wall shear-stress provided the Prandtl number of the convecting fluid is high. Experimental studies described include electrochemical mass-transfer studies carried out on a rotating cylindrical electrode carrier; and heat transfer studies carried out in an oil tunnel. Fair correlation between theory and experiment was found. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 609 415
STANFORD UNIV CALIF

DIRECT ENERGY CONVERSION SYSTEMS. (U)

DESCRIPTIVE NOTE: Quarterly technical summary rept. no. 4, 1 Jun31 Aug 64, SEP 64 98P Eustis, Robert H. ; CONTRACT: AF49 638 1123 PROJ: ARPA Order 246

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), (*MAGNETOHYDRODYNAMICS, ENERGY CONVERSION), (*FUEL CELLS, ENERGY CONVERSION), GENERATORS, ELECTRODES, MATERIALS, WATER, COOLING, ELECTRIC CURRENTS, ELECTRIC INSULATION, FLUID FLOW, PLASMA MEDIUM, BOUNDARY VALUE PROBLEMS, REACTION KINETICS, SHOCK TUBES, CHEMISORPTION, HEAT TRANSFER, TRANSPORT PROPERTIES, BOUNDARY LAYER (U)

The MGD generator electrode materials problem has been greatly simplified by introducing cooling water into the electrode stems. Runs of over one-half hour duration indicate a negligible recession of the surface so that the same electrodes can be used for several runs. Electrical data from the generator indicates a diffuse current with an applied electric field for currents up to about 10 amperes per electrode (current density of about 1 amp/sq cm). Current leakage through the insulating brick has been examined and some changes in brick design and material are being made to reduce this leakage. A more complete report than that previously given is made of the investigation of the influence of the Ramsauer effect on nonequilibrium electron temperatures. The calculation of electrical conductivity by the Chapman-Enskog method has been compared to the method of Frost. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 609 177

GENERAL MOTORS RESEARCH LABS WARREN MICH

INVESTIGATIONS ON THE DIRECT CONVERSION OF NUCLEAR
FISSION ENERGY TO ELECTRICAL ENERGY IN A PLASMA
DIODE. (U)

DESCRIPTIVE NOTE: Annual rept. no. 5, 1 Nov 63-31 Oct
64, OCT 64 119P Leffert, C. B. ; Rees, D. B. ;

Jamerson, F. E. ;
CONTRACT: Nonr-3-0900

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Legibility of this document is in part
unsatisfactory. Reproduction has been made from the best
available copy. See also AD-273 067, AD-425 231.

DESCRIPTORS: (*ENERGY CONVERSION, DIODES), (*ENERGY,
NUCLEAR REACTIONS), (*PLASMA MEDIUM, DIODES), (*DIODES,
PLASMA MEDIUM), NUCLEAR ENERGY, ELECTRICITY, FISSION,
IONS, IONIZATION, RARE GASES, CESIUM, ARGON, NEON,
ZENON (U)

Investigations on the direct conversion of nuclear fission
energy to electrical energy in a plasma diode.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 609 051

MONSANTO RESEARCH CORP DAYTON OHIO

HIGH TEMPERATURE THERMOELECTRIC RESEARCH. (U)

DESCRIPTIVE NOTE: Final technical rept. 15 Sep 63 - 30
Oct 64,

DEC 64 317P Henderson, C. M. ; Ault, R. G. ;
Beaver, E. R. ; Harris, D. H. ; Hedley, W. H. ;
CONTRACT: AF 33(615)-1084

PROJ: AF-8173

TASK: 817302

MONITOR: AFAPL TR-64-135

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-422 854, AD-427 285,
AD-437 280.

DESCRIPTORS: (*THERMOELECTRICITY, POWER SUPPLIES),
(*POWER SUPPLIES, AEROSPACE CRAFT), (*GENERATORS,
THERMOELECTRICITY), HIGH TEMPERATURE, ELECTRIC POWER
PRODUCTION, POWER, TEMPERATURE, SOLAR RADIATION,
RADIOACTIVE ISOTOPES, NUCLEAR REACTORS, MANUFACTURING,
PERFORMANCE (ENGINEERING), BONDING, MATERIALS, COATINGS,
TEST METHODS, ENERGY CONVERSION (U)

Nominal 50-watt (e) and 15-watt (e)
laboratory model generators were designed, fabricated
and subjected to sustained and thermal cycling tests
at a hot-junction temperature of about 1200C, and
cold junctions of about 570C in a vacuum of 10-5 -
10-6 torr. Both generators, constructed of solid-
state, bonded, segmented, p- and n-type
thermoelements showed good resistance to degradation
under these conditions. Improvements in the
properties of thermoelectric materials and interface
bonding techniques for thermoelements were achieved
to yield p-n couples with 17% higher performance,
relative to 196-63 couples. Nuclear reactor,
radioisotope, and solar-heated, high-temperature,
thermoelectric, spacepowered system concepts were
proposed and preliminarily investigated. These
studies showed that high-temperature, (1200C)
thermoelectric space-type power units, ranging in
size from a few watts to several hundred KW output,
can be designed for performances from 335 lbs./
KW(e) for a solar-concentrating type system to 15
lbs./KW(e) for 350 KW(e) or larger space
power systems utilizing fast-reactor heat sources. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 608 839
RENSSELAER POLYTECHNIC INST TROY N Y

ELECTROCHEMICAL ENERGY CONVERSION IN A PALLADIUM
HYDROGEN DIFFUSION ELECTRODE.

(U)

DESCRIPTIVE NOTE: Scientific rept. no. 4,
AUG 64 28P Cleary, H. J.; Greene, N. D. ;
CONTRACT: AF19(604)8377
PROJ: 6694
TASK: 669406
MONITOR: AFCL , 64 803

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-296 569.

DESCRIPTORS: (*ENERGY CONVERSION, ELECTRODES), (*FUEL
CELLS, ELECTRODES), (*ELECTRODES, FUEL CELLS),
(*PALLADIUM, HYDROGEN), DIFFUSION, POLARIZATION,
OXIDATION, ELECTRIC CURRENTS, ELECTROCHEMISTRY,
MEMBRANES

(U)

A high efficiency palladium-hydrogen diffusion
electrode has been developed. Current densities of
165 ma/cm are achieved at 30C on 0.010 inch wall
electrodes after pretreatment by abrading and
oxidizing in air at 800C. Hydrogen transport is
governed by solid state diffusion. An equation for
hydrogen diffusion in beta-pd has been determined:
 $D(\text{sub beta}) = 3.8 \times 0.0001 \exp(-2930/RT)$.
(Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 608 638

GENERAL MOTORS CORP INDIANAPOLIS IND ALLISON DIV

MEASUREMENT OF FLUID PROPERTIES FOR
MAGNETOPLASMA DYNAMIC POWER GENERATORS.

(U)

DESCRIPTIVE NOTE: Quarterly technical summary rept. no. 6,
1 Aug-31 Oct 64,
NOV 64 34P Schneider, R. T. ;
REPT. NO. EDR-4037
CONTRACT: Nonr-4104 00
PROJ: ARPA Order 420

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-604 889.

DESCRIPTORS: (*MAGNETOHYDRODYNAMICS, GENERATORS),
(*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), FLUID
MECHANICS, ELECTRIC POWER PRODUCTION, PLASMA MEDIUM,
CESIUM, INJECTION, PUMPS, HELIUM, SEPARATION, MAGNETIC
FIELDS, VOLTAGE, ELECTRODES, THERMAL DIFFUSION,
THEORY

(U)

The major problems in the design of a
magnetoplasma dynamic system have been those
associated with the gas heater, cesium seeding,
helium purification, and helium cesium separation.
These problems have now been solved to the degree
that reliable operation of the MPD system has been
achieved. Operation of the present small MPD
system yielded sufficient information to permit
design of the large test section which is now under
construction. Ceramic and tantalum parts were never
subject to severe attack by cesium. The quartz
window in contact with the hot cesium-helium mixture
was found to devitrify immediately. No attack
occurred, however, when the windows were sufficiently
cooled. It was necessary, therefore, to remove the
windows from direct contact with the hot working
fluid. The usefulness of the electron heating
effect can not be determined before the 50-cm channel
is in operation. As preliminary indications,
however, the following observations can be reported.
It was not possible to observe an increased
electron temperature with load resistance down to 100
ohm. Since the measurements reported in previous
quarterly summary reports were made, new numerical
results became available.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 607 784

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no.

4, 1 Jun-31 Aug 64,

SEP 64 31P

Jackson, W. D. ; Brown, G. A. ;

Kerrebrock, J. L. ; Carabates, E. N. ;

CONTRACT: AF33 615 1083

PROJ: 8173

TASK: 817306

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-603 235.

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), (*MAGNETOHYDRODYNAMICS, POWER SUPPLIES), (*THERMIONIC CONVERTERS, MATERIALS), GENERATORS, LIQUID METALS, ELECTRICAL CONDUCTIVITY, ALKALI METALS, VAPORIZATION, CESIUM, TRANSPORT PROPERTIES, METAL FILMS, IONS, PENETRATION, TUNGSTEN, SINGLE CRYSTALS, THERMIONIC EMISSION (U)

Research progress in the following areas is reported: (1) magnetohydrodynamic power generation with liquid metals, (2) liquid-metal magnetohydrodynamic generators, (3) alkali-metal magnetohydrodynamic generators, and (4) thermionic energy conversion. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 607 425

ARMY ELECTRONICS LABS FORT MONMOUTH N J

PROCEEDINGS, ANNUAL POWER SOURCES CONFERENCE (14TH), 17-19 MAY 1960. (U)

MAY 60 162P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: This conference was formerly called The Battery Research and Development Conference. Legibility of this document is in part unsatisfactory. Reproduction has been made from best available copy.

DESCRIPTORS: (*BATTERIES AND COMPONENTS, SYMPOSIA), (*POWER SUPPLIES, SYMPOSIA), (*ELECTRIC POWER PRODUCTION, SYMPOSIA), ENERGY CONVERSION, SOLAR RADIATION, THERMAL RADIATION, FUEL CELLS, STORAGE BATTERIES, PRIMARY BATTERIES, ELECTROCHEMISTRY, REVIEWS (U)

Contents: Thermal Energy Conversion Solar Energy Conversion Fuel Cell Batteries Secondary Batteries Comparison Of Energy Conversion Systems Energy Storage Devices High Rate Batteries Primary Batteries (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 607 086

RADIO CORP OF AMERICA LANCASTER PA

THE DEVELOPMENT OF A LOW-TEMPERATURE CYLINDRICAL
THERMIONIC GENERATOR. (U)

DESCRIPTIVE NOTE: Quarterly technical rept. no. 2.

SEP 64 4P

PROJ: 8173

TASK: 817305-9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Also see AD-601 906.

DESCRIPTORS: (*THERMIONIC CONVERTERS, DESIGN), (*ENERGY CONVERSION, THERMIONIC CONVERTERS), ELECTRIC POWER PRODUCTION, POWER EQUIPMENT, HEATERS, LIQUID METALS, SEALS (STOPPERS), TESTS, LIFE EXPECTANCY, INJECTION, MATERIALS, MOLYBDENUM, NICKEL, TUNGSTEN COMPOUNDS, OXIDES, NIOBIUM, RARE GASES, CERAMIC MATERIALS, THERMAL RADIATION (U)

A converter Type A-11988, Serial No. 14, remained on life test for 4470 hours at approximately 150 percent of output power rating with a constant level of 63 watts. The three-converter module A-1274, Serial No. 10 was operated over an emitter temperature range of 1200 to 1350 C for approximately 30 hours with a maximum output of 76 watts. Fabrication of two improved type A-1274 modules was completed. Preliminary tests of these modules indicated the need for modifications of the end-cap diaphragm, ceramic-to-metal seal, and radiator fin configuration. The design and fabrication of the gas injection system was completed and preliminary tests of the system were begun. Two A-1194E converter test vehicles were built to evaluate nickel and molybdenum matrix impregnated with tungsten trioxide as collector materials. Two modified A-1195 variable spacing converters were built, and molybdenum and niobium collectors were tested at high collector temperatures. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 605 266

POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH
INSTDIRECT CONVERSION OF PLASMA KINETIC ENERGY TO R. F.
ELECTROMAGNETIC ENERGY. (U)

DESCRIPTIVE NOTE: Final rept.;

AUG 64 128P

Sandler, M. ;
Levi, E. ; Freidberg, J. ;

REPT. NO. -1224-64

CONTRACT: AF30 602 2980

PROJ: 5573

TASK: 557303

MONITOR: RADC . TDR64 265

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, PLASMAS(PHYSICS)), (*PLASMA MEDIUM, ENERGY CONVERSION), (*MICROWAVES, GENERATORS), ELECTROMAGNETIC RADIATION, RADIOFREQUENCY, PROPAGATION, MAGNETOHYDRODYNAMICS, SHOCK WAVES, WAVE PROPAGATION, OSCILLATION, PLASMAS(PHYSICS), NONLINEAR SYSTEMS, ELECTRONS, KINETIC THEORY, RADAR EQUIPMENT (U)

An outline of the guiding principles and the work accomplished during the contract is presented. This work produced: (1) a novel mathematical technique which makes it possible to follow the development with time of disturbances and the formation of shocks in magnetized plasmas; (2) the discovery of hitherto unknown wave propagation modes which satisfy the two fluid nonlinear plasma dynamical equations; (3) the experimental detection of radiative modes in an impulsively excited toroidal discharge. (Author) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 604 889

GENERAL MOTORS CORP INDIANAPOLIS IND PATTERSON DIV

Measurement of Fluid Properties for
Magnetoplasma Dynamic Power Generators.

(U)

DESCRIPTIVE NOTE: Quarterly technical summary rept. no. 5,

1 May-31 Jul 64,

AUG 64 48P

Schneider, R. T. ;

REPT. NO. EDR-3965

CONTRACT: Nonr-4104 00

PROJ: ARPA Order 420

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MAGNETOHYDRODYNAMICS, GENERATORS),
(*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), ELECTRIC
POWER PRODUCTION, PLASMA MEDIUM, CESIUM, INJECTION,
PUMPS, HELIUM, SEPARATION, MAGNETIC FIELDS, VOLTAGE,
ELECTRODES (U)

It is found that at low field strengths the
generator voltage is proportional to the magnetic
field strength. With increasing field strength the
voltage deviates from this proportionality and
finally saturates. A possible explanation of this
phenomena is presented. The definition of one of
the generator operational problems will allow a
logical attack on the imposed limitations. The
closed loop research facility has undergone several
modifications to improve the operational and control
characteristics. The design of the generator for
Phase II of the contract was initiated.
(Author)

(U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 604 827

AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

ION CLOUD SHAPE AND POTENTIAL DISTRIBUTION IN AN
ELECTRO-FLUID-DYNAMIC GENERATOR.

(U)

DESCRIPTIVE NOTE: Master's thesis,

JUN 64 122P

Wifall, James Robert ;

MONITOR: AFIT ,

GAM/ME/64-22

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PLASMA MEDIUM, PHYSICAL PROPERTIES),
(*ENERGY CONVERSION, PLASMAS(PHYSICS)), IONS, VOLTAGE,
DISTRIBUTION, PROBES (ELECTROMAGNETIC), ELECTRICAL
CORONA, ELECTROSTATICS, ELECTRIC FIELDS, TURBULENCE,
DIFFUSION, GENERATORS, SPACECRAFT, POWER SUPPLIES
IDENTIFIERS: ELECTROHYDRODYNAMIC GENERATORS (U)
(U)

The purpose of the study was to experimentally
determine the ion cloud shape and potential
distribution within the conversion section of an
electro-fluid-dynamic generator. Phase I of the
study dealt with the investigation of a uniform
electro-static field with and without a corona
discharge. The results showed that an extremely
sharp probe point is required to measure the
potential of an electrostatic field and that the ion
cloud, emanating from a single needle in a fluid with
zero velocity, is parabolic in shape. In Phase
II the conversion section was probed with a sharp
pointed probe. Results showed that the flow
pattern has a greater influence on the ion cloud
shape than electrostatic forces, and therefore the
ion cloud diverges rapidly due to the high
turbulence. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 604 120
ADVANCED KINETICS INC COSTA MESA CALIF

PLASMA KINETIC ENERGY-RF CONVERSION.

(U)

DESCRIPTIVE NOTE: Final rept.

JUL 64 80P

CONTRACT: AF30 602 2981

PROJ: 5573

TASK: 557303

MONITOR: RADC , TDR64 174

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MICROWAVES, GENERATORS), (*OSCILLATION, ENERGY CONVERSION), (*ENERGY CONVERSION, PLASMA'S (PHYSICS)), BLACKBODY RADIATION, BREMSSTRAHLUNG, CYCLOTRON RESONANCE PHENOMENA, X BAND, K BAND, ELECTROMAGNETIC PULSES, MICROWAVE FREQUENCY, MAGNETIC FIELDS, ELECTRIC FIELDS, ELECTRON ACCELERATORS, RADAR EQUIPMENT, POWER SUPPLIES, (U)POWER SUPPLIES (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 603 681

AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

EFFECTS OF PARTIAL CONDENSATION AROUND IONS IN ELECTRO-FLUID DYNAMIC ENERGY CONVERSION PROCESSES.

(U)

DESCRIPTIVE NOTE: Master's thesis,

AUG 64 97P

Decaire, John Alvern ;

MONITOR: AFIT , GSP/Phys/64 2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MAGNETOHYDRODYNAMICS, ENERGY CONVERSION), (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), (*COLLOIDS, MAGNETOHYDRODYNAMICS), ELECTRIC FIELDS, PLASMA MEDIUM, DROPS, CONDENSATION, ELECTRICAL CORONA, NOZZLES, WATER VAPOR, CARBON TETRACHLORIDE, POWER SUPPLIES, GENERATORS IDENTIFIERS: ELECTROHYDRODYNAMIC GENERATORS (U) (U)

A theoretical and experimental program is described aimed at studying the possibility of extracting microwave power from the kinetic energy of a plasma. The appropriate theoretical framework is established. Detailed experiments were run at X-band and at K-band. The detected microwave pulse appears before onset of opacity and attains values on the order of 50 to 250 mW for a background pressure of 20 microns Hg, discharge voltages around 20 kV, and magnetic fields around 3.5 kG. The output is studied as a function of magnetic field and of the applied electric field. At K-band two peaks become apparent and these are interpreted in terms of the fundamental and the second harmonic detected in this frequency interval. It is shown that the power output detected is too high to be explained by cyclotron radiation output from a population of values. The mechanism of electron acceleration by over-stability processes is introduced which would seem to explain the high radiation output as the cyclotron radiation from very high speed electrons accelerated by internal processes in the plasma. (Author)

(U)

The investigation was concerned with the direct conversion of fluid dynamic energy into electrical energy. The objectives were to experimentally observe the effect upon the performance of the process when colloids (condensation droplets) are used as the charge carriers and to determine theoretically the mobility of the charged droplets. Tests were made using water and carbon tetrachloride vapors and three initial pressures: 90 psia, 180 psia, and 270 psia. Test results show that the current and power outputs of the experimental generator are greatly increased when colloids rather than ions are used as the charge carriers. Observed current increases are about a factor 4 and power increases about one order of magnitude. Better results were obtained when water vapor was used. Carbon tetrachloride vapor proved to be very effective for the suppression of the corona discharge process.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 603 394

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

FURTHER PROGRESS OF SOVIET SCIENTISTS ON DIRECT
TRANSFORMATION OF HEAT INTO ELECTRICITY, (U)

JUL 64 30

REPT. NO. FTD-TT-64-505

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Unedited rough draft trans. of
Technicka Prace (Czechoslovakia) 1963, v. 15, no. 8,
p. 606.

DESCRIPTORS: (*ENERGY CONVERSION, TRANSFORMATIONS),
THERMOELECTRICITY, PLASMA ENGINES, ELECTRIC PROPULSION,
ALPHAL METALS, ELECTRIC POWER PRODUCTION, (U)
CZECHOSLOVAKIA

The use of alkali metal to raise plasma (used in
special equipment for direct transformation of heat
into electricity) to a high electrical conductivity
is discussed. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 603 259

FRANKLIN INST PHILADELPHIA PA LABS FOR RESEARCH AND
DEVELOPMENT

CATALYTIC COMBUSTION HEAT SOURCES FOR THERMAL ENERGY
CONVERTERS. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 3, 1 Oct

63-15 Feb 64,

FEB 64, 26P

Robert A. ; Reddi, Mullapudi M. ; Baker,

REPT. NO. Q-82088-3

CONTRACT: DA36 039AMC02177E

PROJ: 1G6 22001A053 03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMOELECTRICITY, GENERATORS),
(*GENERATORS, THERMOELECTRICITY), (*COMBUSTION,
CATALYSTS), (*HEATERS, GASOLINE), (*CATALYSTS,
COMBUSTION), ENERGY CONVERSION, HEAT TRANSFER, POWER
SUPPLIES, DESIGN, FLUID FLOW, VANADIUM COMPOUNDS,
OXIDES, ALUMINUM COMPOUNDS (U)
IDENTIFIERS: ALUMINA, THERMOELECTRIC POWER GENERATION,
VANADIUM(V) OXIDE (U)

Investigations leading to the development of a
catalytic burner using leaded gasoline as a fuel for
use with thermoelectric generators are reported.
Detailed parametric studies on a vanadia catalyst
are given. Results of an experimental design were
analyzed by a multivariate regression model and
expressions for percent oxidation and maximum
temperature are given in terms of air and gasoline
flow rates. Effects of catalytic element geometry
on burner heat transfer are discussed and details of
an element configuration are given along with design
details of an experimental thermoelectric generator.
(Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 603 235

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN: ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no. 3, 1 Mar-31 May 64,

JUN 64 25P

Kerrebrock, J. L.; Carabateas, E. N. ; Jackson, W. D. ; Brown, G. A. ;

CONTRACT: AF33 615 1083

PROJ: 8173

TASK: 817306

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMIONIC CONVERTERS, THERMIONIC EMISSION), (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), (*MAGNETOHYDRODYNAMICS, POWER SUPPLIES), SCIENTIFIC RESEARCH, LIQUID METALS, ALKALI METALS, ELECTRICAL CONDUCTIVITY, GENERATORS, ELECTRIC POWER PRODUCTION, CESIUM, PLASMAS (PHYSICS), SPACE PROPULSION, ELECTRONICS, WORK FUNCTIONS, THERMAL CONDUCTIVITY, ELECTRIC PROPULSION (U)

Contents: Magneto hydrodynamic power generation with liquid metals Liquid-metal magnetohydrodynamic generators Magneto hydrodynamic channel flow Electrical conductivity of two-phase liquid-metal flow Systems with alkali-metal vapor generators Study of transport phenomena in cesium thermionic converters Electron and ion emission from different crystallographic orientations in vacuum and in cesium Measurements of the thermal conductivity in cesium gas Studies of surfaces Constant pressure, liquid-metal, MHD conduction generator Nonequilibrium electric conductivity of wet and dry potassium vapor (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 602 759

TEXTRON ELECTRONICS INC SYLMAR CALIF HELIOTEK DIV

HIGH EFFICIENCY SILICON SOLAR CELLS. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 7, 15 Dec 63-15 Mar 64,

APR 64 53P

CONTRACT: DA36 039SC90777

PROJ: 1G6 22001 A053 03

Berman, Paul A. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SOLAR CELLS, SILICON), (*SILICON, SOLAR CELLS), (*ENERGY CONVERSION, SOLAR RADIATION), DESIGN, MANUFACTURING, COSTS, SINTERING, EVAPORATION, DIFFUSION, CRYSTALS, SEMICONDUCTORS, RESISTANCE (ELECTRICAL), OPTIMIZATION, MATRICES (MATHEMATICS) (U)

A polyvariable experiment was performed on P(+)/N solar cells to determine the optimum design for performance at solar intensities of about 350 mW/sq cm. The region of maximum response was determined and indicated that a 13 line grid pattern combined with a 12 minute diffusion time would give the maximum performance for P(+)/N cells operated at solar intensities up to 350 mW/sq cm. A bivariable experiment performed on P(+)/N polycrystalline cells has shown that polycrystalline cells can be optimized and designed for use in concentrated light systems. It was found that cell designs near the region of maximum response actually showed increased efficiencies at 316 mW/sq cm equivalent solar intensities. The fabrication of cells having from 4 to 8 times the active area of the normal 1 x 2 cm cell indicates that large area cells can be made with short circuit current densities and open circuit voltages that compare quite closely with those obtained from 1 x 2 cm. Investigations have been made to determine methods of eliminating the time consuming and relatively expensive junction clean up etch with a more rapid, less costly process. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 602 635

HONEYWELL INC HOPKINS MINN

LOW INPUT VOLTAGE CONVERSION. (U)

DESCRIPTIVE NOTE: Final progress rept. for 1 Jul 62-29

Feb 64, FEB 64 129P Lingle, John T.; Heaner, Sheldon D.;

REPT. NO. MH 68447

CONTRACT: DA36 0395C90808

PROJ: 1G6 22001A053

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*VOLTAGE REGULATORS, DESIGN), (*FUEL CELLS, ENERGY CONVERSION), POWER SUPPLIES, DIRECT CURRENT, ALTERNATING CURRENT, RECTIFIERS, TUNNEL DIODES, MAGNETOHYDRODYNAMICS, THERMIONIC CONVERTERS, THERMOELECTRICITY, BATTERIES AND COMPONENTS, GENERATORS, SOLAR CELLS, PERFORMANCE (ENGINEERING), ELECTRONIC EQUIPMENT (U)

The advent of new power sources such as the fuel cell, thermionic diode, and thermoelectric generator has provided the stimulus for the investigation of low input voltage conversion. Since the voltage output of a single energy conversion cell is too low for most applications, it must be stepped up by either adding cells in series or by a converter. Series connection of some direct conversion sources is difficult, increases cost, reduces reliability, and may require monitoring and parameter control of each cell. The use of a single, large capacity power source cell or a minimum number of series connected source cells coupled to a converter, is considered a tentative and attractive solution to this problem. The initial effort under this contract was specifically directed toward the investigation of all known approaches to determine the optimum and presently most feasible approach to convert the low source voltage of fuel cells, thermionic diodes, thermoelectric generators, solar cells, and single-cell batteries to more usable higher voltages. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 601 912

NAVAL ORDNANCE LAB CORONA CALIF

CHEMOELECTRIC ENERGY CONVERSION FOR NONAQUEOUS RESERVE BATTERY SYSTEMS. (U)

DESCRIPTIVE NOTE: Quarterly rept., for Jan-Mar 64

MAY 64 25P

MONITOR: NAVWEPS 8193

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, ELECTROCHEMISTRY), (*BATTERIES AND COMPONENTS, ELECTROCHEMISTRY), (*ELECTROLYTIC CELLS, ELECTROCHEMISTRY), EUTECTICS, MAGNESIUM, POTASSIUM COMPOUNDS, SODIUM COMPOUNDS, AMMONIUM COMPOUNDS, THIOCYANATES, URANIUM COMPOUNDS, OXIDES, CARBON, NICKEL, ELECTROLYTES, ELECTRODES, LITHIUM ALLOYS, NITROBENZENES, FREE RADICALS, AMMONIA IDENTIFIERS: AMMONIA-ACTIVATED BATTERIES, POTASSIUM THIOCYANATE, SODIUM THIOCYANATE, THIOCYANATE/AMMONIUM, URANIUM(IV) OXIDE (U)

Experimental cell studies in the ionic melt system Mg/KSCN-NaSCN-kaolin/UO3-electrolyte-C/Ni were completed. New studies, which include electrical conductivity, polarography, and chronopotentiometry, were begun on electrolytes with dimethyl sulfone solvent (m.p. 109C). Electrode reaction studies of nitrobenzene in neutral liquid ammonia electrolytes indicate the formation of a phenyl NO2 negative radical with a half-life of approximately half an hour, which can be expected to influence short-life battery discharge performance. Liquid ammonia hardware cells with Mg/metadinitrobenzene (mDNB) electrodes 1 sq cm in area were tested at 25C. The best performance was obtained from Mg/KSCN/NH4SCN-mDNB-C/Ag cells at 25C, which averaged 2.12 volts peak, with a 10% drop during a 5-min discharge into a constant 100-ohm load (21 ma/sq cm peak current). (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 601 906

RADIO CORP OF AMERICA LANCASTER PA

THE DEVELOPMENT OF A LOW-TEMPERATURE CYLINDRICAL
THERMIONIC GENERATOR. (U)DESCRIPTIVE NOTE: Quarterly technical rept. no. 1, Mar-
Jun 64.

JUN 64 39P

CONTRACT: AF33 615 1547 ,AF33 657 8005

PROJ: 8173

TASK: 817305-9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, THERMIONIC CONVERTERS,
(*THERMIONIC CONVERTERS, DESIGN), ELECTRIC POWER
PRODUCTION, HEATERS, LIQUID METALS, CESIUM, MOLYBDENUM,
RARE GASES, INJECTION, THERMAL RADIATION, TESTS (U)

The specific objectives of the program include:
evaluation of existing samples; design and evaluation
of improved modules; investigation of low-work-
function collectors; investigation of high-
temperature collector operation; and investigation of
the effects of inert gas injection. The first
three months of work covered the analysis of prior
failures (See AD-436 806), a continuation of
life testing to more than 4300 hours, and the initial
design for an improved module. A control standard
converter was fabricated for the investigation of
low-workfunction collectors. One sample collector
material was evaluated. A converter design, A-
1195, was modified for high-temperature operation,
and one converter employing a molybdenum emitter and
molybdenum collector was fabricated. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 601 569

POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH
INST

ELECTROMECHANICAL PULSERS. (U)

MAY 64 22P Levi, Enrico ;

REPT. NO. PIBMRI-1129-63

CONTRACT: AF30 602 2149

PROJ: 4506

TASK: 450603

MONITOR: RADC TOR64 109

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ELECTROMECHANICAL CONVERTERS, FEASIBILITY
STUDIES). (*ENERGY CONVERSION, PULSE GENERATORS),
(*PULSE GENERATORS, ENERGY CONVERSION).
PLASMAS(PHYSICS), ELECTROMAGNETIC FIELDS, SHIELDING,
EXCITATION, RADAR TRANSMITTERS, POWER SUPPLIES (U)

Considered is the feasibility of generation of high
energy pulses directly by electromechanical power
conversion without relying on intermediate storage in
electrical form. Extremely large values of power
output per unit volume of the machine can be obtained
within the ambit of present day technology when the
materials are pushed to the limit set by tensile
strength. As an example, units having overall
dimensions comparable with those of a medium sized
turbo-generator can be built to deliver energies up
to 10 to the 10th power Joules in one second and 10
to the 8th power Joules in a few milliseconds.
Guiding principles for the design of these
generators are presented. General relations
governing the performance of converters employing hot
plasmas are established. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 601 417

CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

PLASMA HEATING BY INJECTION OF CHARGED PARTICLES. (U)

MAR 64 192P Hasegawa,A.;Birdsall,C. K.

REPT. NO. 64 5

CONTRACT: AF33 657 7614 ,AF33 615 107

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, PLASMAS(PHYSICS)), (*PLASMAS(PHYSICS), CHARGED PARTICLES), (*PARTICLE BEAMS, PLASMAS(PHYSICS)), HEATING, OSCILLATION, PLASMAS(PHYSICS), CYCLOTRON WAVES, ELECTRON BEAMS, ION BEAMS, THERMONUCLEAR REACTIONS, MATHEMATICAL MODELS (U)

(Obtaining a high-temperature plasma is a basic difficulty in problems of controlled fusion.

Various methods have been proposed, such as injection of a stream of charged particles into the plasma. The work analyses various processes that may occur in the energy conversion from stream to plasma. These processes are collision interactions and high frequency interactions between the stream and plasma. More emphasis is given to the latter. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 601 224

NAVAL RESEARCH LAB WASHINGTON D C

DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS. (U)

DESCRIPTIVE NOTE: Rept. no. 7

APR 64 124P Pickenpaugh,Eileen ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*BIBLIOGRAPHIES, ENERGY CONVERSION), (*ENERGY CONVERSION, BIBLIOGRAPHIES), (*ABSTRACTS, ENERGY CONVERSION), THERMIONIC EMISSION, THERMOELECTRICITY, PHOTOELECTRIC EFFECT, ELECTROCHEMISTRY, MAGNETOHYDRODYNAMICS, ENERGY (U)

A collection of references from various sources covering the current literature on thermoelectricity, thermionic emission, photoelectric processes, magnetohydrodynamics, electrochemical processes, energy storage, and energy sources. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 600 810

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

MAGMA-DEVELOPMENT OF ENERGY: SCIENCE ON THE
THRESHOLD OF FANTASY.

(U)

APR 64 6P Semenov, N. N. ;
REPT. NO. FTD-TT-63-1088

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Savremena Tehnika
(Czechoslovakia) (sic) 1963, no. 15, 19 Aug, p.
288-289.

DESCRIPTORS: (*POWER SUPPLIES, ENERGY CONVERSION),
(*ENERGY CONVERSION, POWER SUPPLIES), CZECHOSLOVAKIA (U)

A popularized discussion of possible future energy
sources (thermonuclear, solar, magma, etc.).

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 600 541

WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)

MECHANOCHEMISTRY OF COUPLED CONTRACTILE AND CHEMICAL
RATE PROCESSES.

(U)

DESCRIPTIVE NOTE: Final rept.,
JAN 64 188P
CONTRACT: AF EDAR62 58
MONITOR: AFOSR , 64 0993

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CHEMICAL REACTIONS, ENERGY), (*ENERGY,
CHEMICAL REACTIONS), (*ENERGY CONVERSION, BIOPHYSICS),
MECHANICS, MOLECULES, MOLECULAR PROPERTIES, FIBERS,
RUBBER, POLYMERS, ELASTIC PROPERTIES, CONTRACTION,
FATIGUE (PHYSIOLOGY), RELAXATION (PHYSIOLOGY), MACHINES,
COLLAGEN
IDENTIFIERS: MECHANOCHEMISTRY (U)
(U)

This work is based on the realization that efficient conversion of chemical into mechanical energy can be based on macromolecular systems of the type encountered in living mechano-chemical systems, such as muscles, flagella or contractile membranes. First the general properties of swollen polymeric fibers or bands which retain their rigidity and useful elastic properties even at high degrees of swelling were studied. The behavior of cross-linked and swollen rubbers were studied in detail. The energetic parameters of interaction between the contractile gel and the added reagent were evaluated. It was found that some of the classical notions of rubber behavior could be applied to swollen rubbers. With a suitable extension of the theory of rubber elasticity, it was possible to account quantitatively for the elastic conversion points of swollen systems. It was found that very suitable mechanochemical engines could be prepared from partially cross-linked collagen fibers and strands. Under the action of strong solutions of lithium bromide or potassium thiocyanate collagen contracts quickly and reversibly and may perform cyclically without fatigue in numerous work cycles. This is the reason why most of this work is devoted to equilibrium and rate studies on collagen fibers. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 600 365

RADIO CORP OF AMERICA HARRISON N J

THERMOELECTRIC POWER MODULES. (U)

DESCRIPTIVE NOTE: Rept. no. 4 (Final), 2 Jan-31

Dec 63,

JAN 64 131P Van Heyst, Hans P. ;

CONTRACT: DA36 039AMC00110E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MODULES (ELECTRONICS), POWER SUPPLIES), (*THERMOELECTRICITY, GENERATORS), (*ENERGY CONVERSION, MODULES (ELECTRONICS)), ELECTRIC POWER PRODUCTION, SILICON, GERMANIUM, THERMODYNAMICS, ELECTRICAL PROPERTIES, DESIGN, TESTS (U)

Silicon-germanium thermoelectric power modules were designed and developed. Modules operated satisfactorily under steady-state and thermal cycling conditions for several thousand hours. These modules were directly exposed to the exhaust gases of various fossil fuels and a number were also tested for shock and vibration. The data in this report will indicate that as a direct result of this research and development effort, a thermoelectric power module was developed which can be used as a building block in the design of thermoelectric power generators. Some effort was spent in obtaining heat transfer characteristics of heat exchangers under free and forced convection conditions. Because of the complex nature of computing the heat transfer properties, a direct analytical solution was not attempted. Much reliance was placed on test results obtained in laboratory experiments and on results reported in literature. The electrical characteristics of the modules were evaluated and an arrangement of either series or series-parallel was determined to satisfy the wide range of voltage and power requirements as specified in the contract requirements. Making use of the developed module design, conceptual 100-watt thermoelectric generator designs are discussed. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 600 320

TRW ELECTROMECHANICAL DIV THOMPSON RAMO WOOLDRIDGE INC
CLEVELAND OHIOAPPLIED RESEARCH PROGRAM FOR BINARY RANKINE CYCLE
ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Final technical rept., Mar 62-Mar 63,

APR 64 266P

Allen, C. H.; Carlton, S. S.;

Lenhart, J. G.; Reimer, R. R.;

REPT. NO. ER5925

CONTRACT: AF33 657 8101

PROJ: 3145

TASK: 314502

MONITOR: TDR64 5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, RANKINE CYCLE), (*RANKINE CYCLE, ENERGY CONVERSION), (*ELECTRIC POWER PRODUCTION, SOLAR PANELS), (*POWER SUPPLIES, SPACECRAFT), FLUIDS, MERCURY, HYDROCARBONS, THERMODYNAMICS, DESIGN, FEASIBILITY STUDIES (U)

The practical feasibility of binary Rankine cycle space power plants was considered and certain technical problem areas were given detailed attention. Specifically, analyses were made of both high and low temperature binary systems and compared with competitive single fluid Rankine power plants. Investigations were made into integration of the system's solar collector and waste heat radiator, the bottom cycle working fluid, and a dynamic, two fluid shaft seal. The combined collector-radiator studies considered the thermal and structural stability of the assembly and devised and developed techniques for its fabrication. The assembly consists of a stretch-formed aluminum sheet to form the collector surface with tubes joined to the back side forming a conventional fin-tube radiator. A very promising low temperature working fluid was selected and evaluated by a series of thermal screening tests followed by a 1000-hour forced convection boiling-condensing loop test. The fluid selected is the aromatic hydrocarbon, ortho-xylene. To permit mounting of the two turbines of the binary system on a common shaft, (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 488 536 10/1
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH
CAMBRIDGE

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no. 12, 1 Jun-31 Aug 66, (U)

SEP 66 22P Brown, George A. ; Kernebrock, Jack L. ; McCune, James E. ;
CONTRACT: AF 33(615)-3489
PROJ: AF-5350
TASK: 535004

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, THEORY),
MAGNETOHYDRODYNAMIC GENERATORS, RESEARCH MANAGEMENT,
ALKALI METALS, HALL EFFECT, FEASIBILITY STUDIES, NUCLEAR
POWERED SHIPS, BRAYTON CYCLE, RANKINE CYCLE, STAGNATION
POINT, SUPERSONIC FLOW, ELECTRIC FIELDS, ELECTRIC
CURRENTS, BOUNDARY LAYER (U)

This report gives a technical review of progress during the period June 1, 1966 to August 31, 1966 on a research program to develop new concepts in energy. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 486 680 20/13 13/11 10/2
RADIO CORP OF AMERICA LANCASTER PA DIRECT ENERGY
CONVERSION DEPT

THE DEVELOPMENT OF A FOSSIL FUEL FIRED HEAT PIPE FOR USE WITH THERMIONIC ENERGY CONVERTERS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 3, 1 Jan-31 Mar 66,
JUL 66 47P Hall, W. B. ; Kessler, S. W. ;
CONTRACT: DA-28-043-AMC-01507(E)
PROJ: DA-16622001A0530
MONITOR: ECOM 01507-3

UNCLASSIFIED REPORT

DESCRIPTORS: (*HEAT TRANSFER, *THERMIONIC CONVERTERS),
(*PIPES, HEAT TRANSFER), DESIGN, OPTIMIZATION,
PERFORMANCE(ENGINEERING), COMBUSTION PRODUCTS, THERMAL
STRESSES, EXPERIMENTAL DATA, ENERGY CONVERSION, HIGH
TEMPERATURE, CERAMIC MATERIALS, BISMUTH, METAL SEALS,
HEAT SHIELDS, FUELS, GASES (U)
IDENTIFIERS: FOSSIL FUEL, HEAT PIPES (U)

Research is presented to optimize the design and to determine the performance characteristics of a heat pipe as an efficient means of transferring heat from a fossil fuel flame to thermionic energy converters. A theoretical analysis of the heat pipe was performed and experimental data are being accumulated to verify the theoretical conclusions. Progress was made on the following tasks: the redesign of the barrier eliminated cracking in the heat dam section; lead will not wet the alumina and therefore is not a satisfactory working fluid; and techniques were developed which produced uniform pore size in the wick structures. Permeation testing determined that of the combustion products of the fossil fuel flame, only small quantities of oxygen passed through the barrier. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 483 724 10/2 20/5
ARMY MISSILE COMMAND REDSTONE ARSENAL ALA PHYSICAL
SCIENCES LAB

A NEW LASER POWER SUPPLY. (U)

JUL 64 252 Cason, Charles ;
REPT. NO. RR-TR-64-14
PROJ: DA-1-B-523801-A-308

UNCLASSIFIED REPORT

DESCRIPTORS: (*LASERS, *ENERGY CONVERSION), (*POWER
SUPPLIES, PULSE GENERATORS), MAGNETOHYDRODYNAMIC
GENERATORS, FLASH LAMPS, FEASIBILITY STUDIES, STORAGE
BATTERIES (U)
IDENTIFIERS: FLASH TUBES (U)

The feasibility of a variety of power supply systems which may be pulsed to deliver the required electrical power to a laser flash tube is considered. Recommendations for a special pile-type battery are made, upon its performance superiority for a minimum advance in technology, as compared to the effectiveness of other systems in an assumed advanced state of development. A specific system is recommended to satisfy the requirements of a proposed flash tube. Output power density of the recommended battery is about 250,000 kw per cubic meter while the recoverable stored electrochemical energy is expected to be more than 75 million joules per cubic meter. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 483 474 10/2
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH
CAMBRID-2

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no.
11, 1 Mar-31 May 66,
JUN 66 12P Brown, George A. ; Kernebrock
Jack L. ; McCune, James E. ;
CONTRACT: AF 33(615)-3489
PROJ: AF-5350
TASK: 535004

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, SCIENTIFIC RESEARCH),
(*MAGNETOHYDRODYNAMIC GENERATORS, DESIGN), LIQUID
METALS, HALL EFFECT, STABILITY, CONFIGURATION,
GENERATORS, MAGNETIC FIELDS, ALKALI METALS, VAPORS (U)

The research program was carried on in four areas:
(1) Liquid-Metal Magneto-hydrodynamic (MHD)
Power Generation, (2) Magneto-hydrodynamic
(MHD) Induction Generators, (3) Alkali-
Vapor Generators, and (4) Hall
Instabilities. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 482 977 10/2 20/9
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

ROYAL SOCIETY 'MEETING FOR DISCUSSION' OF MHD
ELECTRICAL POWER GENERATION.

DESCRIPTIVE NOTE: Technical rept.,

APR 66 43P Murphy, Edward L. ;
REPT. NO. UNRL-C-2-66

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, SYMPOSIA),
(*MAGNETOHYDRODYNAMICS, ELECTRIC POWER PRODUCTION),
REPORTS, SYSTEMS ENGINEERING, REVIEWS, THEORY, GREAT
BRITAIN

Royal Society Meeting for discussion of MHD electric
power generation.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 479 866 10/2 10/1 20/9
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH
CAMBRIDGE

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION.

DESCRIPTIVE NOTE: Quarterly technical progress rept. no.

10, 1 Dec 65-28 Feb 66,
MAR 66 11P Brown, George A. ;
Kerrebrock, Jack L. ;

CONTRACT: AF 33(615)-1083

PROJ: AF-5350

TASK: 535004

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supplement to the Group quarterly
progress rept. no. 81, dated 15 Apr 66.

DESCRIPTORS: (*MAGNETOHYDRODYNAMIC GENERATORS, *ENERGY
CONVERSION), RESEARCH MANAGEMENT, ALKALI METALS, VAPORS,
LIQUID METALS, MEASUREMENT, HIGH TEMPERATURE, BRAYTON
CYCLE, ELECTRICAL CONDUCTIVITY, IONIZATION, RANKINE
CYCLE, THERMIONIC CONVERTERS, SURFACE PROPERTIES,
POTASSIUM, MAGNETIC FIELDS, HALL EFFECT, STABILITY,
PLASMA:(PHYSICS)

Our research program is a continuing effort to
explore and develop new concepts in energy
conversion. At present, work is being carried on
in four areas: Liquid-Metal Magnetohydrodynamic
Power Generation; Magnetohydrodynamic
Induction Generators; Alkali-Vapor
Generators; and Hall Instabilities.
(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 476 962 10/2

RADIO CORP OF AMERICA HARRISON N J

100 WATT THERMOELECTRIC GENERATOR. (U)

DESCRIPTIVE NOTE: Rept. no. 4 (Final) 1 Jul 64-30

JUL 65 130P Van Heyst, H. P.; Schade, O.

H. Jr.;

CONTRACT: DA-28-043-AMC-00265(E)

PROJ: DA-1E6-41209-D-535

TASK: 1E6-41209-D-535-21

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, *GENERATORS), HEAT EXCHANGERS, THERMOELECTRICITY, THERMOCOUPLES, BLOWERS, MODULES(ELECTRONIC), SILICON ALLOYS, GERMANIUM ALLOYS, COMBUSTION, GASOLINE, VAPORIZATION, FUELS, LEAD COMPOUNDS (U)

An exploratory model, 100-watt, thermoelectric generator utilizing silicon-germanium building-block modules was designed, fabricated, tested, and delivered. It employs a vaporizing-type combustion system which is especially suitable for burning leaded gasoline. In the process of converting the gasoline from liquid to vapor, a large percentage of the lead-compound additives and the fuel heavy-ends are removed. Both of these tend to foul the system, hence are undesirable. Tests conducted on the converter-burner subassembly as well as on the complete generator assembly have established the technical feasibility of leaded-gasoline fueled thermoelectric generators using silicon-germanium thermoelements. The prospect of meeting the volume and weight goals of 1 cubic foot and 20 pounds respectively, however, does not look encouraging. Objective values of 1.5 cubic feet and 25 pounds are more realistic. During the latter part of the program, consideration was given to the possible use of an ultrasonic atomizing combustion system which could provide a multi-fuel capability together with an advantage in system maintenance. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 475 633 20/9

GENERAL MOTORS RESEARCH LABS WARREN MICH

INVESTIGATIONS ON THE DIRECT CONVERSION OF NUCLEAR FISSION ENERGY TO ELECTRICAL ENERGY IN A PLASMA DIODE. (U)

DESCRIPTIVE NOTE: Annual rept. no. 6, 1 Nov 64-31 Oct 65.

OCT 65 130P Leffert, Charles B.; Rees, David B.; Gifford, Fay E.;

CONTRACT: Nonr-3109(00)

PROJ: 099-345

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, *PLASMAS(PHYSICS)), MIXTURES, PLASMA MEDIUM, THERMIONIC EMISSION, THERMIONIC CONVERTERS, REACTION KINETICS, RARE GASES, ELECTRON DENSITY, ARGON, CESIUM, NEON, GAS IONIZATION, TRANSPORT PROPERTIES, ELECTRON GUNS, HEAT EXCHANGERS, PLASMA SHEATHS, NEUTRON FLUX, FISSION PRODUCT ACTIVITY, IONS, EXCITATION, DIFFUSION, RECOMBINATION REACTIONS, PRESSURE, MICROWAVES, FREQUENCY SHIFT, MEASUREMENT (U)

Reaction kinetics and electron transport were studied in noble gas plasmas generated by fission fragment ionization in order to evaluate these plasmas for a nuclear thermionic energy converter. The electron density that would result from fission fragment ionization of Ar-Cs and Ne-Ar gas mixtures was predicted from the computed ion generation rate and ion loss processes in the plasma. The first experimental verification of the electron density was made with a resonant microwave cavity operated in pile. The electron transport properties of these plasmas are being investigated theoretically and a ceramic-metal diode with a nuclear thermionic emitter has been developed for in pile measurement of the electron transport properties. Analytical solutions have been obtained for the current-voltage characteristic of a thermionic diode in which the plasma is generated by uniform fission-fragment ionization and the electron density is controlled by ambipolar diffusion loss. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 475 003 10/2

TRW SYSTEMS REDONDO BEACH CALIF

SNAPPODLE DEMONSTRATION DESIGN STUDY. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jul-30 Dec 64,

SEP 65 116P Leventhal, E. L. ;

CONTRACT: AF33(615)-2066

PROJ: AF-5350

TASK: 535002

MONITOR: AFAPL TR-65-4

UNCLASSIFIED REPORT

DESCRIPTORS: (*THERMOELECTRICITY, *GENERATORS), (*ENERGY CONVERSION, THERMOELECTRICITY), DESIGN, POWER SUPPLIES, SOURCES, RADIOACTIVE ISOTOPES, THERMAL ANALYSIS, POLONIUM, SPACE PROPULSION, THRUST, THERMAL CONDUCTIVITY, MECHANICAL DRAWINGS (U)

SNAPPODLE is a combined thruster-thermoelectric energy converter using a radioactive isotope as its primary source of energy. This report covers designs of thermoelectric generators analyzed for thermal characteristics when combined with a PODDLE thruster. The data on the thruster were taken from the PODDLE program with no internal and a minimum of external modifications. The thermal analyses performed define temperatures at critical locations both in the thruster and the thermoelectric converter. Graphs showing the resulting temperature profiles are included. One of the main problems encountered was the determination of the thermal conductance of the thermoelectric converter. Although an exact method for this computation was attempted, an approximate method supplied the actual data for the analyses. The work accomplished has served to point out that the system is feasible and that test data are required for more accurate analyses. The development of a power conditioning subsystem was also shown to be critical. Two hundred and thirty watts of electrical power can be obtained initially from a unit with a total weight of 55 lbs. If the thruster weight is charged to the propulsion system, the power output varies from 230 watts initially to about 65 watts at the end of a half life of PO 210, from a thermoelectric converter weighing 25 lbs. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 474 540 10/2

BATTELLE MEMORIAL INST COLUMBUS OHIO

MULTIFUELED THERMAL-ENERGY- CONVERSION SYSTEMS. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 2

(Final) 1 Jan-31 Aug 65,

AUG 65 56P Hazard, Herbert R. ; Hunter,

Harvey H. ;

CONTRACT: DA-28-043-AMC-00431(E)

PROJ: DA1CG-22001-A-053-01

TASK: 1CG-22001-A-053-03

MONITOR: ECOM 00431-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, *THERMOELECTRICITY), (*POWER EQUIPMENT, ENERGY CONVERSION), FUEL SYSTEMS, GENERATORS, COMBUSTION, FUELS, ATOMIZATION, ULTRASONIC RADIATION, HYDROCARBONS, PERFORMANCE(ENGINEERING), CIRCUITS, DESIGN (U)

IDENTIFIERS: BURNERS (U)

A multifuel burner utilizing ultrasonic atomization was developed and demonstrated. Designed for use with a 100-watt thermoelectric generator, the burner must transfer heat at 7 w/sq. cm. to thermocouple junctions at 300 C, which is accomplished by heating a wire-screen mantle to 1075 C. Burning rate is 1 lb fuel/hr, or 18,000 Btu/hr, but the atomizer and burner design are suitable for burning rates to 50,000 Btu/hr. Fuel properties have no significant effect on performance when firing fuels ranging from aviation gasoline to No. 2 fuel oil, except that the fuel metering valve must be reset with changes in fuel viscosity. The burner is ignited electrically by momentary heating of a glow coil, and full heat output is generated immediately on ignition. Fuel is fed from a tank pressurized to 10 psi and metered with a manual valve; combustion air is supplied by a small fan. The ultrasonic atomizer requires 4 w at 12 v, and the fan requires 5 w. A 12-v battery is required for start-up and for operation until generator power is available. Weight of the demonstration burner is 2.5 lb. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 467 037

BATTELLE MEMORIAL INST COLUMBUS OHIO

MULTIFUELED THERMAL-ENERGY-CONVERSION SYSTEMS. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 1, 1 Jan-31 Mar 65, (U)

HARVEY H. :Ensminger,Dale; Hazard,Herbert R. :Hunter,

CONTRACT: DA-28-043-AMC-00431(E)

PROJ: 1C6 2201A053

TASK: 03

MONITOR: ECOM TR-00431-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMBUSTION CHAMBERS, THERMOELECTRICITY),
(THERMOELECTRICITY, GENERATORS), FUEL INJECTORS, FUELS,
FUE: OIL, DISTILLATION, SPECIFIC GRAVITY, COMBUSTION,
VISCOSITY, ULTRASONIC RADIATION, ATOMIZATION, CLAMPS,
TORQUE, TRIGGER CIRCUITS, ELECTRICAL IMPEDANCE, ENERGY
CONVERSION (U)
IDENTIFIERS: BURNERS, SPECIFIC GRAVITY (U)

Development of an ultrasonic atomizer, 1
transistorized electronic driver, a burner, and fuel
metering equipment was started. Very good
atomization has been demonstrated at fuel rates up to
twice those needed for the demonstration burner. A
satisfactory transistorized driver unit providing
100-kc power has been developed, and major
improvements in efficiency have been made. The
total power input of the present laboratory atomizer
is about 10 watts, but it is anticipated that this
can be reduced by half with further development.
Various burner geometries have been evaluated in
terms of the amount of excess air required for
clean, smokeless combustion, and the ability to
produce the required temperature and heat flux.
Suitable temperature and heat flux have been
achieved, but considerable development remains in
order to achieve uniform temperature and heat flux
distribution, and minimum excess air for combustion.
The effect of excess air is to reduce over-all
efficiency, requiring more fuel input. Evaluation
of capillary tubes and orifices as fuel meters showed
a very large effect of fuel viscosity. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 462 095

RADIO CORP OF AMERICA HARRISON N J

100 WATT THERMOELECTRIC GENERATOR. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 2, 1 Oct-31 Dec 64, (U)

H. ,Jr.: Van Heyst,H. P. :Schade,O.

CONTRACT: DA2E 043AMC00265E

PROJ: 1E6 41209D53512

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMOELECTRICITY, GENERATORS),
(GENERATORS, THERMOELECTRICITY), DESIGN, FEASIBILITY
STUDIES, OPERATION, GASOLINE, ENERGY CONVERSION,
SILICON, GERMANIUM, TEMPERATURE, THERMOCOUPLES,
PYROMETERS, HEAT EXCHANGERS, PERFORMANCE (ENGINEERING),
EFFECTIVENESS, VAPORIZATION, VOLTAGE REGULATORS,
ELECTRIC POWER PRODUCTION, HYDROCARBONS (U)
IDENTIFIERS: EVALUATION, PROPANE (U)

A study converter is being built to evaluate the
converter design and to determine the actual
performance of the power modules. All of the power
modules to be used in this converter have been built
and tested under steady-state conditions with good
results. A heat exchanger using pin fin
construction was built during this quarter. The
results of tests on this heat exchanger indicated
that the design did not satisfy the required
conditions. As a result, other heat exchanger
configurations were evaluated. A Twinfold
lanced and Offset construction was selected as
the best system for use in the final generator.
(Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 462 029

GM DEFENSE RESEARCH LABS SANTA BARBARA CALIF

STUDY OF A THERMOPHOTOVOLTAIC CONVERTER. (U)

DESCRIPTIVE NOTE: Rept. no. 3 (Final), 10 Nov 64-14

Jan 65.

APR 65 39P

REPT. NO. GM-DRL-TR65-23

CONTRACT: DA-28-043-AMC-00067(E)

PROJ: DA-1-C-622001-A-053

TASK: 1-C-622001-A-05303

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PHOTOELECTRIC CELLS (SEMICONDUCTOR), GERMANIUM), (*POWER SUPPLIES, PHOTOELECTRIC CELLS (SEMICONDUCTOR)), (*ENERGY CONVERSION, PHOTOELECTRIC CELLS (SEMICONDUCTOR)), LIGHT TRANSMISSION, INFRARED RADIATION, REFLECTION, OPTICAL COATINGS, MIRRORS, DESIGN, PERFORMANCE (ENGINEERING), ELECTRIC POWER PRODUCTION, EFFECTIVENESS, MEASUREMENT, INSTRUMENTATION, RESISTANCE (ELECTRICAL), VOLTAGE, ELECTRIC CURRENT, HEAT EXCHANGERS, THERMIONIC CONVERTERS, SILICON COMPOUNDS, CARBIDES, FUELS, HYDROCARBONS, PORTABLE EQUIPMENT (U)

Convective and radiative loss measurements were refined on a model TPV system using a calorimeter in vacuum and air. The system has an inner cylindrical mantle (3.75-cm radius) heated internally by conventional fuels, a concentric photocell mount (12.5-cm radius), and reflecting end-mirrors. Power losses in the model system were 0.3 kw to the bottom mirror and 0.4 kw to the top (in vacuum), with additional losses in air (convective losses) of 0.07 kw to the bottom, 0.25 kw to the cylinder, and 0.3 kw to the top. Sample studies showed that highly reflecting ohmic contacts can be produced with a resistance of 0.001 ohm/sq. cm. on p-type, and 0.1 ohm/sq. cm. on lightly doped n-type. Additional cells of the 'non-absorptive' type were produced. Wafers prepared under similar conditions were anti-reflection-coated on both surfaces for maximum transmission at 2.35 microns. The oneway absorption was found to be 3.4%. The devices performed as well or better than the earlier ones. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 453 413

NAVY MARINE ENGINEERING LAB ANNAPOLIS MD

THERMOELECTRICITY: REPORT ON THE STATE-OF-THE-ART MATERIALS AND DEVICES. (U)

DEC 64 73P

Krolick, C. F. ;

REPT. NO. 205 64

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMOELECTRICITY, MATERIALS), (*STANDY-BY GENERATORS, THERMOELECTRICITY), (*GENERATORS, THERMOELECTRICITY), RADIATION EFFECTS, ELECTRON BEAMS, HEAT RESISTANT ALLOYS, HEAT RESISTANT METALS, REFRACTORY METAL ALLOYS, SEMICONDUCTORS, FUELS, BISMUTH ALLOYS, ANTIMONY ALLOYS, TELLURIUM ALLOYS, SELENIUM ALLOYS, LEAD ALLOYS, TIN ALLOYS, SILVER ALLOYS, NIOBIUM COMPOUNDS, ENERGY CONVERSION, OXIDES, INDIUM ALLOYS, BISMUTH ALLOYS, COBALT ALLOYS, COPPER ALLOYS, MOLYBDENUM ALLOYS, SILICON ALLOYS, GERMANIUM ALLOYS (U)

Contents: Thin-film Thermoelectrics; New Material Fabrication and Bonding Techniques; Investigations of Materials; High-Temperature Materials, Materials Research and Development; Thermoelectric Materials Parameters; Ternary and Quaternary Chalcogenides; Materials and Fabrication Techniques; Preparation of Materials; Radiation Effects in Thermoelectric Materials; Refractory Semiconductors; High-Temperature Generator; Chemical-Fueled Thermoelectric Generator; In-Line Generator Module Concept; Five-Watt Buoy Light Generator; Module Improvement Program; Heating and Ventilating System for Combat Clothing; Water-to-Water Air Conditioner; Self-Contained Power Supply; Structural Encapsulation of Thermoelectric Elements. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 453 204

TEXAS INSTRUMENTS INC DALLAS

LOW WORK FUNCTION COLLECTORS.

(U)

DESCRIPTIVE NOTE: Final rept., 1 Nov 63-31 Oct 64,
 NOV 64 122P Chapman, R. A.; Caulfield, H.
 J.; Hem-street, H. W., Jr.; Clendinning, W. R.;

REPT. NO. 03 14 176

CONTRACT: Nonn-3705(00)

PROU: 099 364

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on Basic Research in
 Thermionics.

DESCRIPTORS: (*ENERGY CONVERSION, THERMAL), (*METAL FILMS,
 ENERGY CONVERSION), (*SEMICONDUCTOR FILMS, ENERGY
 CONVERSION), THERMIONIC CONVERTERS, Cesium ALLOYS,
 ANTIMONY ALLOYS, ALUMINUM ALLOYS, OXIDES, TANTALUM
 ALLOYS, TUNGSTEN COMPOUNDS, CARBIDES, GOLD ALLOYS,
 BISMUTH ALLOYS, LEAD ALLOYS, NICKEL ALLOYS, ELECTRODES,
 TEMPERATURE, WORK FUNCTIONS, MEASUREMENT, THEORY
 IDENTIFIERS: THIN FILMS (U)

(M)

Films of Cs-Sb, Cs-Al2O3-Al, Cs-Ta2O5, Cs-WC, Cs-Au, Cs-Bi, Cs-Pb, and Cs-Ni-Sb were studied as collector electrodes. Relative collector work functions were compared in a multiple collector device using cesium reservoir temperatures as high as 300 C, current densities up to 10 amps/sq.cm, and ratios of collector-to-cesium-reservoir temperature up to 1.35. The Cs-Sb collector was found to have a minimum thermionic work function of 3.3 - 1.4 eV at a temperature ratio of 1.3 1.5. At lower temperatures the oxide collectors had lower work functions than Cs-Sb, but none of these collectors was at its minimum work function. The resistance of the 30-Angstrom thick Al2O3 was too large for practical application. When a Cs-Sb on W electrode was used as an emitter above 1000 K, sublimation of Sb from Cs-Sb was sufficient to quench the ignited plasma mode. Alloying Sb with Ni drastically reduced sublimation of Sb in vacuum and in cesium vapor without significantly changing the thermionic work function. The ignited mode was observed with the NiSb2 emitter. The

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AD- 449 713

GM DEFENSE RESEARCH LABS SANTA BARBARA CALIF

STUDY OF A THERMOPHOTOVOLTAIC CONVERTER.

(U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 1, 14
 Apr-11 Aug 64.

REPT. NO. GM-DRL-TR64-53

CONTRACT: DA-28-043-AMC-00067(E)

PROU: DA-1-C-622001-A-053

TASK: 1-C-622001-A-05303

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PHOTOELECTRIC CELLS (SEMICONDUCTOR),
 ENERGY CONVERSION), (*ENERGY CONVERSION, PHOTOELECTRIC
 CELLS (SEMICONDUCTOR)), DESIGN, GERMANIUM ALLOYS,
 PERFORMANCE (ENGINEERING), PORTABLE EQUIPMENT,
 REFLECTORS, CALORIMETERS, GONIOMETERS, SURFACES,
 REFLECTION, INSTRUMENTATION, SOLAR RADIATION (U)

(U)

Components for a portable thermophotovoltaic converter were investigated experimentally and theoretically. Reflector-calorimeters were constructed for heat balance studies, and a first test of mounting procedures and techniques for cells in sets of twenty conducted. Individual nonreflecting cells (without interference coatings) were studied for efficiency as a function of incident radiation density. Cells were 5.5 - 6% efficient at corresponding illumination levels of 9 - 6 watts/sq cm and power output densities of 0.38 - 0.30 watts/sq cm. The transmission of intrinsic germanium wafers at wavelengths beyond the absorption edge was measured under high optical injection conditions. No change in transmission was observed, although a change of even 1% could have been detected. Reflectance measurements were extended to analyze the individual multiple reflections, clearly observed in samples with wedge (following modifications of the reflectance goniometer). These studies aid in interpreting some of the reflectance profiles of samples showing local roughness. The series resistance of photovoltaic cells was analyzed.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 449 408

PENNSYLVANIA UNIV PHILADELPHIA

REVERSIBLE OXYGEN ELECTRODES.

(U)

DESCRIPTIVE NOTE: Quarterly rept. no. 10, 1 Apr-30 June 64,

JUN 64 16P Genshaw, M. ; Brusic, V. ;

Damjanovic, A. ; Bockris, J. O'M. ;

CONTRACT: DA36 039sc88921

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FUEL CELLS, ENERGY CONVERSION), (*ELECTRODES, FUEL CELLS), (*ENERGY CONVERSION, FUEL CELLS), (*OXYGEN, REDUCTION (CHEMISTRY)), CATALYSTS, GOLD, PLATINUM, PALLADIUM, RHODIUM, IRIUM, GOLD ALLOYS, PLATINUM ALLOYS, PALLADIUM ALLOYS, PH FACTOR, SOLUTIONS(MIXTURES), VOLTAGE, ELECTROCHEMISTRY, ADSORPTION

IDENTIFIERS: REVERSIBLE OXYGEN ELECTRODES (U) (U)

Some possible mechanisms of O dissolution are reviewed and briefly discussed. The role of rotating disk electrode with a ring for discriminating between various possible mechanisms is illustrated. In the study of the catalytic activity for the reduction of O, Tafel lines on Pt, Pd, Rh, Ir, and Au electrodes and on a number of Au-Pd and Au-Pt alloy electrodes were obtained in both acid and alkaline media. At zero current density, the rest potentials correspond to those established on oxide free electrodes in oxygenated solutions. Pt, Pd, Pt rich Pt-Au, and Pd rich Pd-Au alloy electrodes showed in acid solutions Tafel slopes close to RT/F, but on Au and Au rich Pt-Au and Pd-Au alloy electrode, the slope is close to 2RT/F. It appears that the change of slope from RT/F to 2RT/F, and also the change in the activity of electrodes, occurs at alloy compositions at which no dissociative adsorption of O is expected. In alkaline solutions, Tafel slopes do not change with alloying, but there is a change in the activity of electrode occurring at the same alloy composition. (Author)

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AD- 440 607

GENERAL MOTORS CORP INDIANAPOLIS IND ALLISON DIV

MEASUREMENT OF FLUID PROPERTIES FOR MAGNETOPLASMA DYNAMIC POWER GENERATORS.

(U)

DESCRIPTIVE NOTE: Quarterly technical summary rept. no. 4, 1 Feb-30 Apr 64,

MAY 64 46P

REPT. NO. ER-7361 Schneider, R. T. ;

CONTRACT: Nonr-4104(00), ARPA Order-420

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MAGNETOHYDRODYNAMICS, PLASMA MEDIUM), (*PLASMA MEDIUM, IONIZATION), (*ENERGY CONVERSION, MAGNETIC FIELDS), CESIUM, THERMODYNAMICS, ELECTRIC ARCS, POWER

IDENTIFIERS: MAGNETO GASE DYNAMICS (U) (U)

Contents: Resume of progress; Test Results: MPD simulation, Cesium runs, Runs with variable magnetic fields, Runs with variable load resistor; Theoretical Investigations - Ionization in nonisothermal plasma, Buildup of nonequilibrium in a reacting plasma flow with transverse magnetic field; Reactive relaxation, Transverse Electron Drift, Intercomponent Thermal Nonequilibrium, Application.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 436 857

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no. 2, 1 Dec 63-29 Feb 64,

CONTRACT: AF33 615 1083

PROJ: AF-8173

TASK: 817306

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS), (*POWER SUPPLIES, MAGNETOHYDRODYNAMICS), THERMIONIC CONVERTERS, LIQUID METALS, ALKALI METALS, CESIUM, METAL FILMS, TUNGSTEN, DIPOLE MOMENTS, SPACE PROPULSION, ELECTRIC POWER PRODUCTION, GENERATORS (U)

Two forms of closed-cycle magnetohydrodynamic power-generation systems and thermionic energy converters are being investigated. Current research topics for the present year are: (1) magnetohydrodynamic power generation with liquid metals, (2) liquid-metal magnetohydrodynamic generators, (3) alkali-metal magnetohydrodynamic generators, and (4) thermionic energy conversion. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 435 885

RADIO CORP OF AMERICA LANCASTER PA

THE DEVELOPMENT OF A LOW-TEMPERATURE VAPORFILLED THERMIONIC CONVERTER FOR NUCLEAR APPLICATIONS. (U)

DESCRIPTIVE NOTE: Summary technical rept., 9 Oct 62-30 Sep 63,

CONTRACT: N0bs84823

PROJ: SF013 0624

TASK: 2853

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMIONIC CONVERTERS, NUCLEAR ENERGY), (*ENERGY CONVERSION, ELECTRIC POWER PRODUCTION), LIFE EXPECTANCY, PERFORMANCE (ENGINEERING), DESIGN, CONFIGURATION, URANIUM COMPOUNDS, OXIDES, EFFECTIVENESS, MATERIALS, ELECTRODES, CESIUM, COMPATIBILITY, TESTS, EQUATIONS, CLEANING, CERAMIC MATERIALS (U)

Modifications to improve the performance and extend the life of the A-1197A converter were made on the basis of information obtained in performance and life tests and a detailed computer analysis. A new nuclear-fueled converter, the RCA Development Type A-1272, was designed. In tests this converter produced more than 10 watts per square centimeter of emitter area. As a result of the experiments with electrically heated converters, the basic principles governing the behavior of series- and parallel-connected converters were defined, mathematical expressions for these basic principles were developed, a method was devised for designing converter systems for use in a reactor and computer programs were prepared that will predict the performance of such systems of converters. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 434 574

GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE
DIV

INVESTIGATION OF NON-EQUILIBRIUM IONIZATION FOR MHD:
ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 8, 15 Dec 63-15

Mar 64.

MAR 64 20P Hoffman, B. ;

CONTRACT: AF33 657 8298

PROJ: 8173

TASK: 817306

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MAGNETOHYDRODYNAMICS, ENERGY CONVERSION),
(*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS),
(*IONIZATION, MAGNETOHYDRODYNAMICS), ELECTRIC FIELDS,
GENERATORS, ELECTRICAL PROPERTIES, POTASSIUM, PRESSURE,
ALKALI METALS, VAPORS, INSTRUMENTATION, ELECTRONS (U)
IDENTIFIERS: SATURATION (U)

This eighth quarterly reports accomplishments during the period 15 December 1963 to 15 March 1964 on a theoretical and applied research program directed toward prolonging the lifetime of magnetohydrodynamic (MHD) energy converters to the range 1000 K to 2000 K. The process of interest is the use of the self-induced electric field in the MHD generator for electrical breakdown of appropriate working fluids of interest. Work at present is directed toward the use of potassium for Rankine (vapor) cycles. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 432 202

SUNDSTRAND AVIATION-DENVER COLO

INVESTIGATION OF A 15-KW SOLAR DYNAMIC POWER SYSTEM
FOR SPACE APPLICATION. (U)

DESCRIPTIVE NOTE: Interim summary rept., 1 Jun 60-1

Jun 62,

JUN 62 344P Nichols, K. E. ;

CONTRACT: AF 33(616)-7128

PROJ: 3145

TASK: 30500

MONITOR: ASD TDR-62-1002

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ELECTRIC POWER PRODUCTION, SPACEBORNE),
(*ENERGY CONVERSION, SOLAR RADIATION), SOLAR FURNACES,
SPACE ENVIRONMENTS, EXPANDED PLASTICS, PARABOLIC BODIES,
REFLECTION, MIRRORS, METAL FILMS, ALUMINUM, ERRORS,
ALTERNATING CURRENT, MOTOR GENERATORS, HEAT EXCHANGERS,
RUBIDIUM, HEAT ENGINES, LIQUID METALS, BEARINGS (U)

The general design studies, detailed design efforts, conceptual experimental component fabrication, and development testing completed through the report period is summarized. During the report period the evaluation and generation of design technology predominated. Through system studies a full scale design was created consisting of an inflatable concentrator, a solar energy divider, a double cavity heat receiver-storage unit, a multi-stage turbo-alternator assembly running on rubidium lubricated hydrodynamic bearings, and a radial flow radiator-condenser. Feasibility studies and designs were completed for an orientation system which minimizes reaction forces fed back to an assumed vehicle. Studies were completed for the integration and erection of the space power system (SPS) with an assumed vehicle. First priority was given to proving feasible a large size solar concentrator. A design competition was staged between a folding rigid mirror and an inflatable type. During this competition, 10 foot diameter scale models of each were built and tested. Several flux traps were designed and tested. The heat receiver-storage assembly remains the most critical element of the system. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 431 610

SMITH (A O) CORP MILWAUKEE WIS

NOVEL POWER SOURCES FOR SHELTERS,

(U)

MAR 63 147P Lauck, Francis W. ;Overbye,

Vern D. ;

CONTRACT: NCD 0562 243

TASK: 1411U

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, SOURCES), (*POWER SUPPLIES, SHELTERS), (*SHELTERS, POWER SUPPLIES), THERMIONIC CONVERTERS, FUEL CELLS, THERMOELECTRICITY, MAGNETOHYDRODYNAMICS, SOLAR CELLS, PIEZOELECTRIC EFFECT, TURBINES, ROTOR BLADES (TURBOMACHINERY), GAS TURBINES, MONOPROPELLANTS, NUCLEAR REACTORS, RADIOACTIVE ISOTOPES, WOOD, COAL, FUELS, FUEL OIL, GASOLINE, PETROLEUM PRODUCTS, BOILERS, HEAT TRANSFER, BIBLIOGRAPHIES, THERMIONIC EMISSION, FLUIDS, SOLIDS, GASES, STORAGE (U)

Contents: Prime Movers for Conventional Stand-by Power Systems; Newer Conversion Devices; Novel Conversion Devices; Fuels; Combustion Equipment; Heat Rejection Equipment.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 431 557

GM DEFENSE RESEARCH LABS SANTA BARBARA CALIF

STUDY OF A THERMOPHOTOVOLTAIC CONVERTER.

(U)

DESCRIPTIVE NOTE: Final rept., 1 Jan-31 Dec 63.

FEB 64 139p

REPT. NO. GM-DRL-TR64-16

CONTRACT: DA-36-039-AMC-02255(E)

PROJ: DA-1-G-11209-D-534

TASK: 1-G-641209-D-53410

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PHOTOELECTRIC CELLS (SEMICONDUCTOR), MATERIALS), (*PHOTOELECTRIC MATERIALS, THERMOELECTRICITY), (*SOLAR RADIATION, ENERGY CONVERSION), (*THERMOELECTRICITY, SEMICONDUCTORS), (*ENERGY CONVERSION, PHOTOELECTRIC CELLS (SEMICONDUCTOR)), PORTABLE (MAN-PORTABLE), THERMAL CONDUCTIVITY, GERMANIUM SILICON, ELECTRIC POWER PRODUCTION, REFLECTION, IMPURITIES, ENERGY, HIGH TEMPERATURE RESEARCH, EMISSIVITY, GOLD, SILICON COMPOUNDS, CARBIDES, ANTIMONY ALLOYS, GALLIUM ALLOYS, INDIUM ALLOYS, ABSORPTION, ELECTRICAL PROPERTIES, ELECTRIC POTENTIAL, ELECTRIC CURRENTS, GONIOMETERS, INFRARED RADIATION, THEORY (U)

Components for a portable thermophotovoltaic energy converter have been investigated experimentally and theoretically. Using a newly designed reflectance goniometer, reflectance values were measured for specular front-surface gold-on-germanium (98.3%), for specular front-surface germanium and rear-surface germanium-gold combined (92.7%), and for a rougher scattering front-surface gold-on-germanium (97.4%). It appears that adequately transparent germanium cells can be made with a 4% long-wavelength transmission loss per round trip, with acceptable Fermi and doping levels. Neither gallium antimonide nor indium arsenide shows promise as an alternative to germanium. For burner mantle materials, SiC shows promise. The reflectance measurements on Cr-CoFe oxide-stained alumina indicate that the emissivity may be as high as 0.95; stained oxides may therefore also be suitable. Design studies for a burner with 30% stack loss were completed. (Author)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 430 796

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no.

1. 1 Sep30 Nov 63,

1. NOV 63

Jackson, W. D.; Brown, G.

A.; Kerrebrock, J. L.; Carabateas, E. N.;

CONTRACT: AF33 616 1083

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, SCIENTIFIC RESEARCH),
MAGNETOHYDRODYNAMICS, POWER, GENERATORS, ALKALI METALS,
THERMIONIC CONVERTERS, IONS, LIQUID METALS, ELECTRICAL
CONDUCTIVITY, VAPORS, CESIUM, SURFACE PROPERTIES,
MEASUREMENTS (U)

Research on new concepts in energy conversion.

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 430 693

NAVAL RESEARCH LAB WASHINGTON D C

DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS. (U)

DEC 63 156P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*BIBLIOGRAPHIES, ENERGY CONVERSION),
(*ENERGY CONVERSION, BIBLIOGRAPHIES), (*POWER SUPPLIES,
ABSTRACTS), (*ELECTRIC POWER PRODUCTION,
BIBLIOGRAPHIES), THERMOELECTRICITY, THERMIONIC EMISSION,
MAGNETOHYDRODYNAMICS, FUEL CELLS, ENERGY, PHOTOELECTRIC
CELLS (SEMICONDUCTOR), ELECTROCHEMISTRY, BATTERIES AND,
THERMIONIC CONVERTERS, NUCLEAR (U)

This is the sixth in a series of bibliographies
covering unclassified literature related to the
direct conversion of energy. Subject coverage
includes thermoelectricity, thermionic emission,
photoelectric processes, magnetohydrodynamics,
electrochemical processes, energy storage, and
energy sources. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMD7

AD- 430 023

STANFORD UNIV CALIF

DIRECT ENERGY CONVERSION SYSTEMS.

(U)

DESCRIPTIVE NOTE: Quarterly technical summary rept. no. 1,

1 Oct30 Nov 63.

DEC 63 23P

Eustis, Robert H. ;

CONTRACT: AF49 638 1123

PROJ: 2466

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, SCIENTIFIC RESEARCH),
MAGNETOHYDRODYNAMICS, COMBUSTION, POWER, HEAT TRANSFER,
FLUID FLOW, FRICTION, PHYSICS, SHOCK TUBES,
ELECTROCHEMISTRY, ELECTRODES, CATALYSIS, CRYSTALS,

IDENTIFIERS: MAGNETOGASDYNAMICS (U)
(U)

The research described in the present report includes magnetogasdynamic energy conversion research in a combustion gas MGD generator and in a shock tube and electrochemical research related to fuel cell energy conversion. Three power generating runs were made with the MGD generator in which electrical characteristics for segmented operation were determined and electrode materials were evaluated. Power generated at 13 pairs of

electrodes exceeded 2 kilowatts. The open-circuit voltage was about 115 volts and short-circuit current about 5 amperes. Plasma-sprayed coatings on the graphite electrodes significantly increased the electrode life. Molybdenum-disilicide was the most effective coating material tested. A study was made of the kinetics of oxidation of aliphatic and olefinic hydrocarbons on single doped and undoped crystal platinum in HClO₄ electrolyte using a translating crystal electrode. An examination of the double layer capacities of platinum in acid solutions obtained via the coulometric pulse were compared to those values obtained by Faradaic impedance. Agreement was shown within the experimental error. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMD7

AD- 429 505

NORTHEASTERN UNIV BOSTON MASS

RESEARCH IN ENERGY CONVERSION.

(U)

DESCRIPTIVE NOTE: Final rept., 1 July 60-30 Sep 63.

NOV 63 304P

CONTRACT: AF 19(604)-7358

PROJ: AF-6692, AF-6694

TASK: 669204, 669402

MONITOR: AFCRL 63-940

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, SCIENTIFIC RESEARCH),
(*SOLAR CELLS, SINGLE CRYSTALS), SILICON, CRYSTAL
GROWTH, VAPOR PLATING, PHOTOELECTRIC EFFECT,
PHOTOCHEMICAL REACTIONS, THERMOELECTRICITY, THERMIONIC
CONVERTERS, PLASMAS(PHYSICS), NITROGEN COMPOUNDS, SULFUR
COMPOUNDS, SEMICONDUCTORS, ORGANIC SULFUR COMPOUNDS,
CHELATE COMPOUNDS, METALORGANIC COMPOUNDS, ELECTRICAL
PROPERTIES, ELECTRIC POWER PRODUCTION, SPACECRAFT,
OPTICAL PROPERTIES (U)

Research in energy conversion: Photovoltaic,
thermoelectric, thermionic, and photochemical phenomena.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 428 999
TEXTRON ELECTRONICS INC SYLMAR CALIF HELIOTEK DIV

HIGH EFFICIENCY SILICON SOLAR CELLS. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 5, 15
June-15 Sep 63,

OCT 63 1V Berman, Paul A. ;
CONTRACT: JA36 039sc90777
PROJ: 1GC22001A053 03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SOLAR CELLS, SILICON). (*SILICON, SOLAR CELLS). (*ENERGY CONVERSION, SOLAR CELLS). CRYSTALS, DIFFUSION, DESIGN, COATINGS, SILICON COMPOUNDS, OXIDES, RESISTANCE (ELECTRICAL), COSTS, STATISTICAL ANALYSIS (U)

Some additional statistical analyses of the first N(+P) bivariable experiment were made. The variance on this experiment was greater from run to run than within a run, at any given design point. A preliminary statistical experiment was performed on N(+P) cells having between 5 and 27 grid lines with diffusion times of 20 and 80 minutes. Half the cells were coated with SiO while half were not. Experimental results showed a flat optimum between 9 and 18 grid lines, and between the diffusion times of 20 and 80 min. With regard to the latter variable, the relative insensitivity of N(+P) cell efficiencies, as compared to P(+N) cell efficiencies, with variation of junction depth was again observed, and this insensitivity caused some difficulty in determining a clear superiority of one diffusion time over the other due to the masking effects of other variables. Cells having total cell series resistances of less than 0.20 ohms were fabricated. Polycrystalline cells showed sunlight conversion efficiencies of as high as 11%.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 427 745
CARNEGIE INST OF TECH PITTSBURGH PA

UNCONVENTIONAL METHODS FOR INFLUENCING FLUID FLOW.
VOL. II. THE THERMOMOLECULAR EFFECT WITH APPLICATIONS TO ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Final rept.

NOV 63 85P McLennan, George Anthony ;
CONTRACT: AF3? 657 9914
PROJ: 8169
TASK: 816904
MONITOR: TDR63 776, Vol. 2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, THERMODYNAMICS). (*FLUID FLOW, GASES), REFRIGERANT COMPRESSORS, THERMIONIC CONVERTERS, HEAT TRANSFER, IRREVERSIBLE PROCESSES, WORK FUNCTIONS, REFRIGERATION SYSTEMS, TEMPERATURE, EFFECTIVENESS (U)

The phenomenon of the thermomolecular pressure rise in a gas, which occurs across a capillary material by virtue of a temperature difference, has been analyzed in several energy conversion devices which are by nature thermodynamically irreversible. Large temperature differences have been considered. The effects of heat transfer through the capillary material and a potential energy work function have been included. Three different heat engine cycles were analyzed requiring different thermodynamic processes, and the maximum efficiency determined for various imposed temperature differences, treating heat transfer and the work function separately. The efficiency of a single device was compared to that of a cascade of similar devices operating over the same temperature difference. A thermomolecular gas compressor, having no moving parts, was analyzed and the efficiency and pressure rise determined as a function of a gas flow rate, treating heat transfer, work function and imposed temperatures as parameters. A thermomolecular refrigeration cycle was considered in which a mechanically imposed gas flow results in a refrigerating effect. The minimum possible refrigerated temperature and the maximum effectiveness of this device were determined for various values of the appropriate parameters. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 427 285

MONSANTO RESEARCH CORP DAYTON OHIO

HIGH TEMPERATURE THERMOELECTRIC RESEARCH. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 1, 15

Sep-31 Dec 63.

DEC 63 Henderson, C. M. ;

CONTRACT: AF33 615 1084

PROJ: 8173

TASK: 817302 9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GENERATORS, THERMOELECTRICITY), (*ENERGY CONVERSION, THERMOELECTRICITY), SPACECRAFT, NUCLEAR ENERGY, SOLAR RADIATION, PERFORMANCE (ENGINEERING), TESTS, EXPERIMENTAL DATA, FAILURE (MECHANICS), THERMOCOUPLES, VIBRATION, DESIGN, CONFIGURATION, TEMPERATURE, WEIGHT, ELECTRIC ARCS, PLASMA MEDIUM, FLAME SPRAYING, AUXILIARY POWER PLANTS, COATINGS, WIRE, MOLYBDENUM, GRAPHITE, RADIOACTIVE ISOTOPES, POWER, TEST FACILITIES, HIGH TEMPERATURE RESEARCH, POWER SUPPLIES, AEROSPACE CRAFT, ELECTRIC POWER PRODUCTION (U)

A study is presented of the feasibility of utilizing high temperature thermoelectric generators, powered with nuclear and solar heat sources for long-lived power supplies for aerospace vehicles. A 50-watt laboratory generator, fabricated of segmented thermoelements and preliminarily tested, was subjected to sustained testing with its hot-junction at 1215 C, its cold junction 570 C and in a vacuum of 10 to the -5th power to 10 to the -6th power Torr. This generator exhibited a 12.8 watt/lb performance ratio at an overall thermal efficiency of 2%. At the end of 266 hrs continuous performance, an unstable power output condition of the generator halted the test. Investigation of the causes of the unstable power output showed that the intermediate junction design temperature of the segmented n-type thermoelements used in the generator had been exceeded by about 100 C. No damage to the high temperature (850-1200 C) thermoelectric segments or junction materials was sustained. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 427 134

BATTELLE MEMORIAL INST COLUMBUS OHIO

MULTIFUELED THERMAL-ENERGY-CONVERSION SYSTEMS. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 5, 1

July-30 Sep 63,

SEP 63 Hazard, H. R. ; Roop, D. E. ;

CONTRACT: DA36 039sc90838

PROJ: 1G6 22001A053 03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMOELECTRICITY, GENERATORS), (*ELECTRIC POWER PRODUCTION, GENERATORS), (*FUELS, THERMOELECTRICITY), STEAM, BOILERS, CHARCOAL, ENERGY CONVERSION, WOOD, COMBUSTION, ENTHALPY, BURNING RATE, ABSORPTION, HEAT, FEASIBILITY STUDIES (U)

The objective of this task is to investigate the feasibility of utilizing wood, charcoal, coal, or other locally available fuels found in worldwide areas as a heat source for a thermoelectric generator or small engine-driven generator capable of producing 150 watts of electric power. A small steam boiler sized for a 150-watt power source was evaluated with charcoal, wood, and cow dung as fuel. Satisfactory combustion and boiler efficiency were obtained with heat absorption rates from 2 to 8 kw th. Start-up periods were 5 to 10 minutes, depending upon technique and fuel. A second boiler, of minimum size and weight, was designed. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 427 025

NAVAL ORDNANCE LAB WHITE OAK MD

ELECTROMECHANICAL ENERGY CONVERSION BY MEANS OF
VARIATION OF RELUCTANCE.

(U)

OCT 63

Roland W. ;

REPT. NO. NOL-TR-63-233

Preisman, Albert ; Schlie,

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, MAGNET COILS),
ELECTROMAGNETIC PROPERTIES, MAGNETIC CORES, MAGNETIC
FIELDS, CIRCUITS, COILS, ELECTROMAGNETS (U)

Formulas are developed for conversion of mechanical
energy that is required to partition an iron-core
magnetic circuit into electrical energy in a
secondary coil circuit. Preliminary experimental
test results tend essentially to substantiate the
formulas as well as to point to new test setups that
will be more accurate. (Author) (U)

UNCLASSIFIED

CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 425 751

AVCO EVERETT RESEARCH LAB EVERETT MASS

MAGNETIC FIELD ANNIHILATION.

(U)

OCT 63

REPT. NO. AMP123

CONTRACT: Nonr2524 00

PROJ: AMP123

Petschek, H. E. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the Solar Flare
Symposium, 2830 Oct 63, at Goddard Space Flight
Center, Greenbelt, Md.

DESCRIPTORS: (*MAGNETIC FIELDS, ANNIHILATION REACTIONS),
(*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS),
PLASMAS (PHYSICS), SOLAR FLARES, ATMOSPHERE MODELS,
BOUNDARY LAYER, GAS FLOW, IONOSPHERIC PROPAGATION,
COMPRESSIBLE FLOW, TURBULENCE, PROPAGATION, ONE
DIMENSIONAL FLOW, INCOMPRESSIBLE FLOW (U)

Sweet's mechanism for the rate of annihilation of
magnetic field at the boundary between two regions
of plasma containing oppositely directed field lines
is re-examined. It is pointed out that previous
analyses overlooked standing magnetohydrodynamic
waves as a possible mechanism for converting magnetic
energy to plasma energy. An estimate of the
annihilation rate including such waves is made.
Using this rate it is found that the energy
required for a flare can be released in 100 sec.
This time is short enough to account for the
observed solar flare times if the source of the flare
energy is stored magnetic energy. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 425 699

AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO

PRELIMINARY WEIGHT ESTIMATES FOR ADVANCED DYNAMIC ENERGY CONVERSION SYSTEMS.

(U)

SEP 63 100P Huffman, George D. ;
 MONITOR: ASD TDR63 705

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the ASD 1963 Science Engineering Symposium, 18-19 Sep 63, at Wright-Patterson Air Force Base, Ohio.

DESCRIPTORS: (*ENERGY CONVERSION, POWER SUPPLIES), (*AUXILIARY POWER PLANTS, ELECTRIC PROPULSION), (*POWER SUPPLIES, ELECTRIC PROPULSION), (*POTASSIUM, ENERGY CONVERSION), (*SODIUM, ENERGY CONVERSION), (*ELECTRIC PROPULSION, POWER SUPPLIES), LIQUID METALS, LITHIUM, BISMUTH, LEAD(METAL), ELECTRIC PROPULSION, BOILERS, HEAT EXCHANGERS, TURBINES, GENERATORS, CONDENSERS (LIQUIFIERS), RADIATORS(HEATING AND COOLING), MATHEMATICAL ANALYSIS, TABLES(DATA), DESIGN (U)

An assessment of working fluids for use in a high-temperature dynamic power conversion system is presented. The method of comparison of the various fluids consists of a preliminary design of the major system components. The results are presented as conversion system weights for the considered fluids, potassium, sodium, lithium, bismuth, and lead, at various values of turbine inlet temperatures. On the basis of the generated data, it has been concluded that only potassium and sodium are practical for use as a working fluid in the temperature range of consideration, 2000 to 4000 R. It is further concluded that potassium and sodium at turbine inlet temperatures from 2800 to 3200 R offer systems of sufficiently low weight to warrant further and more detailed investigations.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 424 672

GM DEFENSE RESEARCH LABS SANTA BARBARA CALIF

STUDY OF A THERMOPHOTOVOLTAIC CONVERTER.

(U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 2, 1 May-31 Aug 63.

NOV 63 33P

REPT. NO. GM-DRL-P63-242

CONTRACT: DA-C3-039-AMC-02255

PROJ: DA-1-G-641209-D-534

TASK: 1-G-641209-D-53410

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMOELECTRICITY, ELECTRIC POWER PRODUCTION), (*PHOTOELECTRIC CELLS (SEMICONDUCTOR), MATERIALS), THERMIONIC CONVERTERS, THERMIONIC EMISSION, GERMANIUM, SEMICONDUCTORS, HEAT EXCHANGERS, HYDROCARBONS, HEATERS, CERAMIC MATERIALS, EPOXY RESINS, THERMAL CONDUCTIVITY, SILICON COMPOUNDS, CARBIDES, GALLIUM ALLOYS, ANTIMONY ALLOYS, INDIUM ALLOYS, ARSENIC ALLOYS, ARSENIDES, ABSORPTION, REFRACTIVE INDEX, CERAMIC COATINGS, EMISSIVITY, RESISTANCE (ELECTRICAL) (U)
 IDENTIFIERS: THERMOPHOTOVOLTAIC CONVERTER (U)

Materials and components for a thermophotovoltaic converter were studied theoretically and experimentally. Germanium photovoltaic cells were tested at output power-densities ranging up to 1.9 watts/sq cm under high illumination levels; grid design calculations were carried out on the basis of these measurements. Techniques were developed for mounting high power-density, optically aligned photocells on a cylindrical cooling jacket. Two semi-conductor materials were examined as possible alternatives to germanium. Preliminary data are included on the reflectivity of emission enhancement coatings on a ceramic substrate; experiments were performed to determine the life of a new diffusion coating on a metallic substrate. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 423 909

GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE
DIV

INVESTIGATION OF NON-THERMAL IONIZATION FOR A.I.D
ENERGY CONVERSION, (U)

OCT 63 189P

Hoffman, B. ; Shair, F. H. ;

CONTRACT: AF33 657 8298

PROJ: 8173

TASK: 817306

MONITOR: RTD TDR63 4071, pt. 1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETOHYDRODYNAMICS),
(*MAGNETOHYDRODYNAMICS, ENERGY CONVERSION), (*ELECTRIC
POWER PRODUCTION, MAGNETOHYDRODYNAMICS), MAGNETIC
FIELDS, ELECTRIC FIELDS, ALKALI METALS, RARE GASES,
PLASMAS(PHYSICS), GAS IONIZATION, ARGON, CESIUM,
POTASSIUM, DIODES, ELECTRICAL CONDUCTIVITY, THEORY (U)

This report describes a theoretical and applied research program directed toward prolonging the lifetime of magnetohydrodynamic (MHD) energy converters by reducing the necessary operating temperatures to the range 1000 - 2000 K. The process of interest is the use of the magnetically induced electric field in the MHD generator for electrical breakdown of appropriate working fluids. Work was directed toward the use of alkali metals for Rankine (vapor) cycles (although the results are applicable to Brayton cycles with certain nuclear reactors) and alkali metal seeded noble gases for studying the basic parameters of the breakdown. (Author) (U)

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 422 583

MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

THEORY OF GALVANO-THERMOMAGNETIC ENERGY CONVERSION
DEVICES. V. DEVICES CONSTRUCTED FROM ANISOTROPIC
MATERIALS, (U)

DEC 62 5P

Harman, T. C. ; Honig, J. M. ;

Tarmy, B. M. ;

UNCLASSIFIED REPORT

Reprint from Journal of Applied Physics, 34:8, pp.
2225-2229, Aug 63. (Copies not supplied by DDC)
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETIC FIELDS),
(*THERMAL DIFFUSION, MAGNETIC FIELDS), (*ELECTRIC
FIELDS, MAGNETIC FIELDS), (*THERMOELECTRICITY, ENERGY
CONVERSION), ELECTRIC POWER PRODUCTION, REFRIGERATION
SYSTEMS (U)
IDENTIFIERS: GALVANOMAGNETISM, THERMOMAGNETIC EFFECTS,
UMKEHR EFFECT (U)

Operating characteristics of galvano-thermomagnetic generators and refrigerators for any anisotropic material are summarized in tabular form for both the longitudinal (thermoelectric) and transverse (Nernst) devices and for isothermal and adiabatic operating conditions. In the most general case, device performance is governed not only by the merit, but also by an anisotropy factor. This factor involves off-diagonal elements of the Nernst and Seebeck tensors for Nernst devices and diagonal elements of the Nernst and Seebeck tensors for thermoelectric devices. It is believed that the Umkehr effect (such as observed in Bi) is due to a nonvanishing diagonal component of the Nernst tensor. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 421 687

MCGILL UNIV MONTREAL (QUEBEC)

KINEMATIC DIVERGENCE AND LARGE-SCALE ENERGY CONVERSION.

(U)

JUL 63 93P Eddy, Amos ;
CONTRACT: AF19 604 8431
PROJ: 7690 .8604
TASK: 769001 .804005
MONITOR: AFRCL 63 840

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*METEOROLOGY, AIR MASS), (*AIR MASS ANALYSIS, METEOROLOGY), (*ENERGY CONVERSION, TROPOSPHERE), (*WIND, UPPER ATMOSPHERE), MEASUREMENT, METEOROLOGICAL PHENOMENA (U)

Experimental evidence is presented in support of the hypothesis that real, large-scale divergence and energy conversion processes can be analyzed from the winds and temperatures reported by the present North American rawinsonde network. The Bellamy triangle method has been used to produce divergence and this divergence is shown to have continuity in the horizontal, the vertical and in time. A discussion of the scale on which this parameter can be analysed objectively and the errors involved are presented. Energy conversion processes associated with an individual weather system are displayed in map form for comparison with other synoptic features. (author) (U)

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AD- 421 601

ARMY ELECTRONICS LABS FORT MONMOUTH N J

PROCEEDINGS 15TH ANNUAL POWER SOURCES CONFERENCE.

(U)

61 162P

UNCLASSIFIED REPORT

DESCRIPTORS: (*POWER SUPPLIES, SYMPOSIA), (*SYMPOSIA, POWER SUPPLIES), (*FUEL CELLS, SYMPOSIA), (*PRIMARY BATTERIES, SYMPOSIA), (*STORAGE BATTERIES, SYMPOSIA), (*SOLAR CELLS, SYMPOSIA), (*THERMOELECTRICITY, SYMPOSIA), (*ENERGY CONVERSION, SYMPOSIA), PLASMAS(PHYSICS), MEMBRANES, ION EXCHANGE, ELECTRODES, CARBON, CATALYSTS, HYDROGEN, OXYGEN, PHOTOCHEMICAL REACTIONS, THERMIONIC CONVERTERS, TRIODES, CRYOGENICS, NICKEL, CADMIUM, ZINC, SILVER COMPOUNDS, OXIDES, SEALS (STOPPERS), AMMONIA, LIQUIDS (U)
IDENTIFIERS: REGENERATIVE FUEL CELLS (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 420 421

NAVAL RESEARCH LAB WASHINGTON D C

DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS, (U)

JUL 63 178P Pickenpaugh, Eileen ;

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, BIBLIOGRAPHIES),
(*THERMOELECTRICITY, ABSTRACTS), (*BIBLIOGRAPHIES,
ENERGY CONVERSION), THERMIONIC CONVERTERS, THERMIONIC
EMISSION, MAGNETOHYDRODYNAMICS, POWER SUPPLIES, SOLAR
CELLS, GENERATORS (U)

A collection of references from various sources
covering the current literature on thermoelectricity,
thermionic emission, photoelectric processes,
magnetohydrodynamics, electrochemical processes,
energy storage, and energy sources. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 418 984

GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE
DIV

INVESTIGATION OF NON-EQUILIBRIUM IONIZATION FOR MHD
ENERGY CONVERSION. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 6, 15 Je-15 Sep
63,

SEP 63 1V Hoffman, B. ;

CONTRACT: AF33 657 8298

PROJ: 8173

TASK: 817306

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, MAGNETO), TEMPERATURE,
ELECTRIC FIELDS, GENERATORS, FLUIDS, POTASSIUM, VAPORS,
ARGON, CESIUM, GAS FLOW, NUCLEAR REACTORS, ALKALI, GAS
IONIZATION. (U)

This sixth quarterly reports accomplishments during
the period 15 June 1963 to 15 September 1963 on a
theoretical and applied research program directed
toward prolonging the lifetime of magnetohydrodynamic
(MHD) energy converters by reducing the necessary
operating temperatures to the range of 1000 degrees
K to 2000 degrees K. The process of interest
is the use of the self-induced electric field in the
MHD generator for electrical break-down of
appropriate working fluids of interest. Work at
present is directed toward the use of potassium for
Rankine (vapor) cycles and argon plus cesium
for studying the basic parameters of the break-down,
although the results are applicable to gas
(Brayton) cycles with certain nuclear reactors.
During the present report period installation of
the potassium vapor blowdown system proceeded toward
operational capability. The design of the alkali
metal vapor loop was essentially completed and design
of the MHD test section (experiment) was
initiated. A theoretical study of the effect of
wet potassium vapor (droplets) on non-equilib-
rium electron heating (and, generator perform-
ance) was undertaken. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 418 348

BAITELLE MEMORIAL INST COLUMBUS OHIO

MULTIFUELED THERMAL-ENERGY-CONVERSION SYSTEMS. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 4, 1 Apr-30 June 63.

JUN 63 42P

CONTRACT: DA36 039SC90838

PROJ: 166 2201A053 03

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, THERMO), (*THERMOELECTRICITY, THERMIONIC), (*THERMIONIC CONVERTERS, COM), HEAT, WOOD, COAL, COOLING, STEAM, BOILERS, THERMOCOUPLES, GENERATORS, GERMANIUM, SILICON ALLOYS, CONVECTION, TEMPERA, TEST METHODS. (U)

Design studies of 150-watt power sources of simple design, fired with a variety of solid fuels, show that Stirling-cycle unit of 3.1% efficiency should weigh about 22 kg, and a Rankine-cycle unit of 5.7% efficiency should weigh about 15 kg. Efficiencies are on electric-power output and fuel heating value. Studies of a thermoelectric generator based on Ge-Si technology are incomplete, but indicate that a unit of 3% efficiency should weigh about 5 kg. A simulated thermoelectric generator under test was modified, following which rated heat absorption rates of 3 kw th were obtained with all fuels. A survey of coal types found in less developed areas showed that almost all of the coal available is free burning and, thus, suitable for use in burners under study. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 418 322

GENERAL INSTRUMENT CORP NEWARK N J

SOLAR FLAT PLATE THERMOELECTRIC GENERATOR RESEARCH. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 2, 1 June-1 Sep 63.

SEP 63 24P

CONTRACT: AF33 657 10335

PROJ: 8173

TASK: 817302

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR PANELS, THERMOELECTRIC), (*AUXILIARY POWER PLANTS, SPACECRAFT), DESIGN, OPTICAL COATINGS, TEMPERATURE, STRUC, THERMOCOUPLES, ENERGY CONVERSION, SOLAR RADIATION, METAL PLATES, PIPES, ALUMINUM, NICKEL, THICKNESS, WEIGHT, SOLDERED JOINTS, TESTS. (U)

A solar flat plate thermoelectric generator consists of a collector plate with an optically selective coating, small size semiconductor thermoelements, a radiator plate and a support structure. Emphasis has been placed on a support structure concept designated as the integral reinforced plate in which radiator and collector plates are folded into self-supporting structures. A number of thermal cycling tests have been conducted up to a maximum of 2000 cycles. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 415 668

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

THE PROBLEM OF ELECTRON JET ENGINES AND THE DIRECT
CONVERSION OF HEAT ENERGY INTO ELECTRIC (FROM DATA IN
THE FOREIGN PRESS), (U)

APR 63 21P Kaplyanskiy, A. Ye.;
MONITOR: FTD T163 298 1 2 4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. from Elektrichestvo, no. 11,
pp. 7-13, 1961.

DESCRIPTORS: (*ELECTRIC PROPULSION, ELECTRIC), (*ROCKET
ENGINES, ELECTRON), (*ENERGY CONVERSION, GENERATORS),
HEAT, SPACE FLIGHT, PLASMA JETS, ION ENGINES. (U)

The problem of electron jet engines and the direct
conversion of heat energy into electric energy.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 411 369

BATTELLE MEMORIAL INST COLUMBUS OHIO

MULTIFUELED THERMAL-ENERGY-CONVERSION SYSTEMS. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 3, 1 Jan-
31 Mar 63,

63 18P Hazard, H. R.; Whitacre, G. R.;
Seiler, M. R.; Timberlake, A. B.;
REPT. NO. 3
CONTRACT: DA36 039sc90838
PROJ: 3A99 09 001

UNCLASSIFIED REPORT

DESCRIPTORS: (*THERMIONIC CONVERTERS, COMBUS),
(*THERMOELECTRICITY, HIGH-TEM), (*ELECTRIC POWER
PRODUCTION, FUELS), EFFECTIVENESS, LEAD COMPOUNDS,
TELLURIDES. (U)

Operation of several compact combustion chambers
was studied experimentally, and it was found pos-
sible to maintain uniform exit-gas temperatures of
1100 C to 1225 C when firing charcoal, green
wood, animal dung, and small grains. A simulated
internally fired thermoelectric unit containing a
heat meter and calorimeter, and with thermal
characteristics simulating those of a thermoelec tric
unit, was designed and tested. Heat-transfer
effectiveness was far higher than in previous units,
ranging from 58 to 74%; this compares with
corresponding values of 18 to 30% for previous
units. This performance permits design of a
thermoelectric unit, based on lead telluride
technology, having thermal efficiency of about 3.0
3.5%. (Author) (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 410 932

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

ENERGY, ITS SOURCES ON EARTH AND ITS ORIGIN. PART IV, (U)

MAY 63 1059 Lazarev, P.P.;
REPT. NO. FTD-TT-61-479

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. from Energiya, Yeye
Istochniki Na Zemle i Yeye Proiskhozhdeniye,
Izd-vo AN SSSR, Moskva, pp. 195-276, 1959.

DESCRIPTORS: (*ENERGY, SOURCES), (*MASS-ENERGY, SOLAR
SYSTEMU, (*NUCLEAR ENERGY, RESONANCE ABSORPTION),
PHYSICS, ASTROPHYSICS, BIOPHYSICS, SOLAR FLARES, SOLAR
RADIATION, WIND, FUELS, ENERGY CONVERSION, ELECTRIC
POWER PRO, NUCLEAR REACTORS, PROTONS, NUCLEONS. (U)

Energy sources on earth.

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 408 889

JOINT PUBLICATIONS RESEARCH SERVICE WASHINGTON D C

EFFECTS AT THE CATHODE OF A PLASMA DIODE AS A MODEL
OF MAGNETOGAS DYNAMIC ENERGY CONVERSION, (U)

MAY 63 6P Morgulis, N.D.;
REPT. NO. 19408

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Ukrayins'kyi Fizychnyi
Zhurnal (USSR) 1962, v. 7, no. 10, pp. 1131-1134. Also
from OTS for \$.50 as rept. 63-21917.

DESCRIPTORS: (*ENERGY CONVERSION), HEAT, ELECTRICITY,
(*MAGNETOHYDRODYNAMICS), (*PLASMA, (*DIODES), CATHODES, (U)
(*THERMIONIC, MODELS (SIMULATION.)

Effects at the cathode of a plasma diode as a model of a
magnetogas dynamic energy conversion.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 408 671

GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE
DIV

RESEARCH IN MHD POWER GENERATION.

(U)

DESCRIPTIVE NOTE: Quarterly rept. no. 4, for period ending

30 June 63,

JUN 63

Sutton, G.W.;

CONTRACT: Nonr386700

PROJ: ARPA Order 325 326

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION, PLASMA),
(*MAGNETODYNAMICS, POWER SUP), GASES, IONIZATION,
MAGNETIC FIELDS, ELECTRONS, DENSITY, SPECTROSCOPY,
ATOMIC SPEC, SHOCK TUBES, XENON, BARIUM, ARGON, DIODE(U)

The development of non-thermal and metastable ionization for closed cycle MHD electrical power generation systems with either metal vapors or seeded gases for naval applications is considered. The program shall first, demonstrate non-thermal and metastable ionization, and second, generate actual power with such ionization. Experiments on non-thermal ionization are being conducted in the 2 in. x 2 in. tube and the argon-barium diode. Power generation is being conducted in the shock tube.
(Author)

(U)

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CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 406 704

ICN PHYSICS CORP BURLINGTON MASS

P-N JUNCTION FORMATION TECHNIQUES.

(U)

DESCRIPTIVE NOTE: Quarterly technical progress rept. no.

2, 20 Feb 19 May 63.

MAY 63

41P

CONTRACT: AF33 657 10505

UNCLASSIFIED REPORT

DESCRIPTORS: *PHOTOELECTRIC CELLS (SEMICON, *SOLAR CELLS, *ENERGY CONVERSION, SERVOMOTORS, ROTATION, ION BEAMS, EFFECTIVE, MEASUREMENT, HEAT TREATMENT, RADIATION, TEMPERATURE, SOLAR SPECTRUM, ION

(U)

Final tests were made on all p-on-n cells im planted in vestigation of effects of junction depth on cell performance. Indications are that it will be possible to produce cells having a good match to the solar spectrum by reducing junction depth. Cells with junction depths of 0.76 micron have a spectral response peak at 7500 Angstroms (equal energy input) vs. the usual 8500 Angstrom peak for diffusion produced p-on-n-type cells. Cell efficiency was raised to the 7-8% range under 2800 K tungsten illumination. This improvement is apparently due to changes in junction profile. It was shown that high oxygen content (> 10 to the 15th power O atoms/cc is an important factor in reducing cell performance. Reflection electron diffraction studies indicate that lattice damage caused by implantation is completely repaired with 800 C annealing for 16 hours. This heat treatment has no effect on bulk lifetime. Initial investigations on n-on-p cells were made by bombarding 0.4 ohm-cm p-type silicon with phosphorus ions. Results on unfinished cells are analogous to those for p-on-n cells. (Author)

(U)

AD-A070 500

DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA
ENERGY CONVERSION. (U)
JUN 79

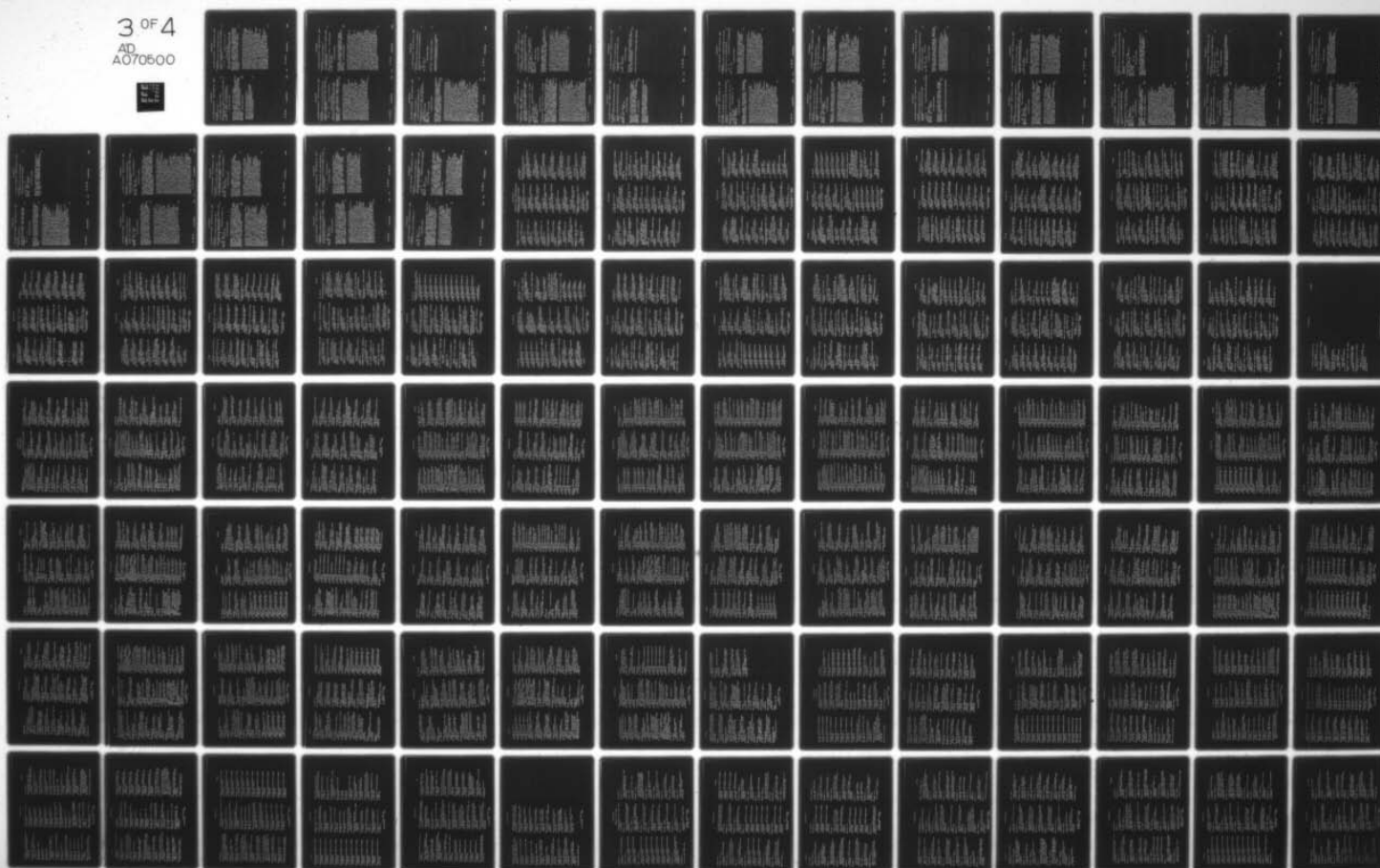
F/G 10/1

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DDC/BIB-79/03

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A070500



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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 406 355

STANFORD UNIV CALIF

DIRECT ENERGY CONVERSION SYSTEMS. (U)

DESCRIPTIVE NOTE: Semiannual technical summary rept. no. (U)

3, 1 Oct 62-1 Apr 63,

APR 63 52P Kruger, Charles H.;

CONTRACT: AF 49(638)-1123, ARPA Order-246-62

UNCLASSIFIED REPORT

DESCRIPTORS: *ENERGY CONVERSION, *THERMO,
 *MAGNETOHYDRODYNAMICS, *FUEL, *ELECTROCHEMISTRY, *ELECTRIC
 POWER, HIGH TEMPERATURE RESEARCH, PLASMAS(PHYSICS),
 CALIBRATION, SHOCK TUBES, ELECTRODES, SINGLE CRYSTALS,
 INSTRUMENTATION, INTERFEROMETERS, MAGNETO OPTIC EFFECT,
 ELEC, ELECTRICAL IMPEDANCE, MATHEMATICAL,
 MEASUREMENT. (U)

IDENTIFIERS: SEEBECK COEFFICIENT (U)

Contents: Magnetogasdynamics Channel
 Shock tube Fuel cells K studies
 Chemisorption studies Thermoelectricity Basic
 materials research Measurements at elevated
 temperatures Transient performance of
 thermoelectric generators (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 403 593

MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

THEORY OF GALVANO-THERMOMAGNETIC ENERGY CON VERSION
 DEVICES. I. GENERATORS. (U)

APR 62 11P

Harman, T.C.; Honig, J.M.;

UNCLASSIFIED REPORT

Reprint from Jnl. of Applied Physics, 33:11, pp.
 3178-3188, Nov 62. (Copies not supplied by DDC)

DESCRIPTORS: *ENERGY CONVERSION, *GENERATORS, MAGNETIC
 PROPERTIES, MAGNETIC MATERIALS, MAGNETIC FIELDS, HEAT,
 RESISTANCE (ELECTRICAL), THERMAL CONDUCTIVITY, PARTIAL
 DIFFERENTIAL, DIFFERENTIAL EQUATIONS, NUMERICAL
 INTEGRATION, TAYLOR'S SERIES, THEORY, MULTIPLE
 OPERATION. (U)

Using phenomenological equations in partially
 inverted form, the operation of galvano-thermo magnetic
 generators has been analyzed for six different modes
 of operation. The efficiency, figure of merit, and
 geometry optimization have been investigated. The
 two-dimensional temperature distribution prevailing
 in a device arm is also briefly analyzed. For the
 longitudinal case where heat flow and current are
 colinear in a transverse field, H sub z , the
 mathematical relations conform to the standard
 theory, except that the transport coefficients depend
 on H sub z . In the transverse case where heat
 flow, current, and magnetic field are mutually
 perpendicular, new expressions are obtained for the
 figure of merit and device efficiency.
 Furthermore, in the latter case the optimal
 operating conditions are those in which both device
 arms are made of the same material. The results
 are discussed in the light of some existing
 experimental data. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 403 589

MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

THEORY OF GALVANO-THERMOMAGNETIC ENERGY CONVERSION DEVICES. I. GENERATORS. (U)

APR 62 11P

Harman, T.C.; Honig, J.M.;

UNCLASSIFIED REPORT

Reprint from Jnl. of Applied Physics, 33:11, pp. 3178-3188, Nov 62. (Copies not supplied by DDC)

DESCRIPTORS: *ENERGY CONVERSION, *PARTIAL, *ELECTRIC CURRENTS, *MAGNETIC FIELDS, HEAT, THERMAL CONDUCTIVITY, THERMOELECTRICITY. (U)

Using phenomenological equations in partially inverted form, the operation of galvanic-thermo magnetic generators has been analyzed for six different modes of operation. The efficiency, figure of merit, and geometry optimization have been investigated. The two-dimensional temperature distribution prevailing in a device arm is also briefly analyzed. For the 'longitudinal' case where heat flow and current are colinear in a transverse field, Hz, the mathematical relations conform to the standard theory, except that the transport coefficients depend on Hz. In the transverse case where heat flow, current, and magnetic field are mutually perpendicular, new expressions are obtained for the figure of merit and device efficiency. Furthermore, in the latter case the optimal operating conditions in which both device arms are made of the same material. The results are discussed in the light of some existing experimental data. (Author) (U)

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AD- 403 536

MARKS POLARIZED CORP WHITESTONE N Y

THE CONVERSION OF HEAT TO ELECTRICAL POWER BY MEANS OF A CHARGED AEROSOL. (U)

DESCRIPTIVE NOTE: Final rept., 1 Feb 62-4 Aug 62.

APR 63 39P

CONTRACT: N0w62 0644

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *ENERGY CONVERSION, EFFECTIVENESS, NOZZLES, AIR, GAS FLOW, ELECTRIC FIELDS, THEORY, CONDENSATION, AEROSOLS, ED PARTICLES. (U)

IDENTIFIERS: ELECTROHYDRODYNAMICS (U)

A new process called the condensation aerosol method for the production of small, charged aerosol particles has been developed for use in the electrohydrodynamic energy conversion process. Using this concept, several generators may be placed in series, each one using the same vapor for aerosol formation as the previous unit. Power densities as high as 30 watts/sq. cm. of nozzle throat area have been obtained with a single stage condensation aerosol type EHD generator. Studies of the aerodynamic behavior of the EHD generator with and without energy extraction were made on a fully instrumented test bench. Measurements of the overall efficiency of the generator including frictional losses were made and are reported herein. The kinetic to electric power conversion efficiency of the generator itself was as high as eighty-five percent. Efforts were made toward designing and building a closed loop system for the generator. A small compressor system for circulating a gas in a closed loop was tested. Calculations were made for the design of a small boiler system for operating a closed loop steam cycle at a few atmospheres pressure. (Author) (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 402 695

ILL RESEARCH INST CHICAGO ILL

A NUCLEAR-PHOTON ENERGY CONVERSION STUDY. (U)

DESCRIPTIVE NOTE: Final rept., Apr 62-Feb 63,

MAR 63 61P Watts, H.V.; Oestreich, M.D.;

Robinson, R.J.;

CONTRACT: AF33 657 8527

PROJ: 8173

TASK: 817301 17

MONITOR: ASD TDR 63 244

UNCLASSIFIED REPORT

DESCRIPTORS: *ENERGY CONVERSION, *NUCLEAR, PHOTOELECTRIC CELLS (SEMICONDUCTORS), RADIOACTIVE ISOTOPES, BETA PARTICLES, ABSORP, LUMINESCENCE, PHOSPHORESCENT MATERIALS, ELECTRIC POTENTIAL RADIATION EFFECTS, TEMPERATURE, SILICON, ZINC COMPOUNDS, PHOTONS. (U)

A double energy conversion technique was studied for aerospace use as a radioisotope powered 10 watt electrical output power source. In this technique, beta particles from a radioisotope are absorbed by a luminescent material which emits a multiplicity of low energy photons. These photons are then converted to electrical energy by a photovoltaic device. The three components (radioisotope, phosphor, and photovoltaic cell) are discussed individually and then in combination in various geometries of source-phosphor and phosphor-photovoltaic converter. Nuclear radiation effects on the phosphor and photovoltaic materials restrict the choice of the radioisotope to a low energy beta emitter; and temperature effects limit the number of unit power cells which may be stacked in one bundle. These effects are more pronounced in silicon photovoltaic converters than in ZnCdS: Cu type phosphors. A ten watt output power source fabricated with currently available materials (Pm-147, ZnCdS: Cu, and silicon photovoltaic cells) would have an overall energy conversion efficiency of about 0.2 percent and a power per weight ratio of 4 mw/lb. It is estimated that the power per weight could be increased by a factor of ten to fifty if certain ideal materials were available.

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AD- 402 017

JOINT PUBLICATIONS RESEARCH SERVICE WASHINGTON D C

PHILOSOPHICAL QUESTIONS OF THE TRANSFORMATION OF NATURE (U)

MAR 63 1V

REPT. NO. 18046

UNCLASSIFIED REPORT

DESCRIPTORS: *ENERGY CONVERSION, ECOLOGY (U)

TRANSLATION OF FOREIGN RESEARCH ON PHILOSOPHICAL QUESTIONS OF THE TRANSFORMATION OF NATURE.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 391 707 10/1 20/6
GENERAL MOTORS RESEARCH LABS WARREN MICH

INVESTIGATIONS ON THE DIRECT CONVERSION OF NUCLEAR
FISSION ENERGY TO ELECTRICAL ENERGY IN A PLASMA
DIODE. VOLUME II. (U)

DESCRIPTIVE NOTE: Rept. no. 8 (Final), 1 Nov 66-31
Oct 67,

JUN 68 61P Gifford, Fay E. ; Leffert,
Charles B. ; Rees, David B. ;

REPT. NO. GMR-2731

CONTRACT: Nonr-3109(00)

PROJ: NR-095-345

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-670 469.

DESCRIPTORS: (*ENERGY CONVERSION, *ELECTRIC POWER
PRODUCTION) (U) *THERMIONIC CONVERTERS, *DIODES, PLASMA
MEDIUM, FISSION, NEUTRON FLUX, THERMOELECTRICITY,
TRANSPORT PROPERTIES, ELECTRON DENSITY, ELECTRON GUNS,
ELECTRIC CURRENTS, METAL COATINGS, THERMIONIC EMISSION,
FISSION PRODUCTS, ARGON, CESIUM, SURFACES, BARIUM
COMPOUNDS, OXIDES, URANIUM COMPOUNDS, DIOXIDES, TUNGS (U)
IDENTIFIERS: *PLASMA DIODES, DIAGNOSIS (GENERAL),
PLASMAS (PHYSICS), THERMOELECTRIC ENERGY CONVERSION (U)

Inpile experiments on the transport of thermionic
electrons through the argon-cesium plasma are
described and the results are compared with
predictions of a diffusion-loss dominated transport
model and recombination-dominated limits. The
inpile experiments were performed using ceramic-metal
diodes of parallel-plane configuration, with an
unclad thermionic-electron and fission-fragment
emitter, and also containing an evacuated electron-
gun section by means of which the emitter temperature
could be heated in a manner independent of the
nuclear heat. Maximum short-circuit current
densities of about 0.3 A/sq cm were obtained in
these diagnostic diodes at a neutron flux value of
around ten trillion per sq cm per sec. These
current densities were much higher (by factors of 5
to 30) than those predicted by the diffusion-loss
dominated transport-model. Furthermore, in marked
contrast with theory, these current densities were
similar for two values of emitter-collector spacing
(0.15 and 0.3 cm). (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 366 663 19/1 10/1 20/9
FALCON RESEARCH AND DEVELOPMENT CO DENVER COLO

EXPLOSIVE SOURCES FOR MAGNETOHYDRODYNAMIC ENERGY
CONVERSION - SUPPLEMENT 1. (U)

DESCRIPTIVE NOTE: Final rept. Jun 63-Oct 64,

APR 65 30P Burnham, Marvin W. ;

CONTRACT: AF08 635 3618

PROJ: AF2511

TASK: 251107

MONITOR: ATL TR-65-14-Supp-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENERGY CONVERSION,
*MAGNETOHYDRODYNAMICS), MODEL TESTS, EXPLOSIVE, PARTIAL
DIFFERENTIAL EQUATIONS, DISKS, REACTION KINETICS (U)
DETONATION WAVES, DETONATIONS, PRESSURE (U)

Experimental results are reported for peripherally
initiated disc-shaped solid explosives. These
produced a relative acceleration of the detonation
wave near the charge axis. The results are
compared with three approximate models. An energy
model is compared with the more conventional pressure
model. High pressure was induced in a portion of a
long rectangular charge by shock. Rather high
detonation wave propagation rates were observed in
the shocked region. These rates were as high as
nine times steady state if the maximum slope of the
position-time result was used and as high as two
times steady state velocity if the average rate over
the approximate shocked region were used. The
results are considered tentative. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 299 004

TAPCO DIV THOMPSON RAMO WOOLDRIDGE INC INGLEWOOD
CALIF

LONG-LIFE THERMIONIC CONVERTERS FOR SOLAR POWER
SYSTEMS (U)

FEB 63 1V

CONTRACT: AF33 616 8114

MONITOR: ASD TOR62 1069

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *THERMIONIC
EMISSION, CESIUM, DESIGN, EFFECTIVENESS, ELECTRIC
POTENTIAL, FAILURE (MECHANICS), INSTRUMENTATION, LIFE
EXPECTANCY, SOLAR CELLS, SPACE ENVIRONMENTS,
TEMPERATURE, TEST FACILITIES, TEST METHODS, THERMIONIC
CONVERTERS (U)
(M)

IDENTIFIERS: SOLAR GENERATORS

LONG-LIFE THERMIONIC CONVERTERS FOR SOLAR POWER SYSTEMS.
EFFORTS ARE DIRECTED TOWARDS INCREASING THE LIFE
CYCLE OF SOLAR THERMIONIC GENERATORS. SPECIALIZED
EQUIPMENT, TECHNIQUES, AND DESIGN DETAILS ARE
PRESENTED.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 297 833

HUGHES AIRCRAFT CO CULVER CITY CALIF

CESIUM PLASMA STUDIES FOR THERMIONIC ENERGY
CONVERSION (U)

MAY 63 1V

CONTRACT: NONR350100

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRONS, *ENERGY CONVERSION, *GAS
IONIZATION, *PLASMAS(PHYSICS), *RESISTANCE (ELECTRICAL),
CESIUM, THERMIONIC EMISSION (U)

CESIUM PLASMA STUDIES FOR THERMIONIC ENERGY CONVERSION.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 297 158

MHD RESEARCH INC NEWPORT BEACH CALIF

RESEARCH ON THE PHYSICS OF CONTINUOUS AND PULSED MHD GENERATORS (U)

DESCRIPTIVE NOTE: Semi-annual technical rept. no. 1, 1
Jun-31 Dec 62.

FEB 63 84P Jones, Malcolm S. , Jr. ;

Brumfield, Robert C. ;

REPT. NO. MHD-632

CONTRACT: N0NR385900

UNCLASSIFIED REPORT

DESCRIPTORS: *CESIUM, *ENERGY CONVERSION, *EXPLOSIONS, *MAGNETOHYDRODYNAMICS, *PLASMAS(PHYSICS), ELECTRIC POWER PRODUCTION, ION SOURCES, MAGNETIC FIELDS (U)

Short duration electrical pulses of 1.8 mw peak power have been produced from 10 grams of seeded condensed explosives by MHD principles. The pulse length is about 10 microseconds. Low ionization potential materials are applied either as surface seeding or mixed into the bulk explosive. The effect upon power output of the geometry of the explosion tube, the size, geometry and composition of the explosive charge, and magnetic field intensity and electrode geometry are discussed. Longer duration pulsed power in the time range of one millisecond to one second will be produced using non-detonating (deflagrating) explosives. This apparatus is described, and various potential seeded propellants are discussed. Numerical calculations and microwave probing experiments of seeded combustion product flows indicate that electron attachment in combustion product gases may be an important factor in determining conductivity. Various scaling and geometry considerations for several configurations of explosive-driven MHD generators are discussed. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 296 892

AERONAUTICAL CHART AND INFORMATION CENTER ST LOUIS MO

ERROR ANALYSIS BY THE COVARIANCE METHOD (U)

JAN' 63 1V SHULTZ, MELVIN E.; RICHARDSON, DONALD

A.;
REPT. NO. RP16

UNCLASSIFIED REPORT

DESCRIPTORS: *ERRORS, *GEODESICS, ANALYSIS OF VARIANCE, CORRELATION TECHNIQUES, DATA, LEAST SQUARES METHOD, MATRICES(MATHEMATICS), PROBABILITY, REAL VARIABLES, STATISTICAL ANALYSIS, STATISTICAL DATA, STATISTICAL DISTRIBUTIONS, STATISTICAL FUNCTIONS (U)

The analysis of dependent errors makes use of the concept of distribution moments and the moment matrix (covariance matrix). This paper presents an analysis of the normal bivariate and trivariate error distributions along with their relationships to the moment matrix, and the application of this concept to least squares and adjustments. It is shown that a suitable transformation of the covariance matrix yields independent errors which may be substituted for the dependent errors in further error analysis. A brief introduction to matrix properties is also included for background information. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 294 000 WESTINGHOUSE ELECTRIC CORP BALTIMORE MD

PHOTOEMISSIVE ENERGY CONVERSION APPLIED RESEARCH PROGRAM

(U)

DEC 62 1/ LIMANSKY, IGOR; WOOD, E. F.; JENSEN, A. S.;
 REPT. NO. TOR62 10211183A
 CONTRACT: AF33 657 7865
 MONITOR: ASD TOR62 1021

UNCLASSIFIED REPORT

DESCRIPTORS: *POWER SUPPLIES, DESIGN, ELECTRIC POWER PRODUCTION, ENERGY CONVERSION, FEASIBILITY STUDIES, PHOTOELECTRIC EFFECT, SOLAR RADIATION, THEORY (U)

THE FEASIBILITY WAS STUDIED OF MAKING A CLOSESPACED, GLASS-SANDWICH PHOTOEMISSIVE SOLAR POWER CONVERTER. IT WAS NOT POSSIBLE TO MAKE OPERABLE SEALED-OFF CONVERTERS IN THE LABORATORY DUE TO THE DIFFICULTY OF SEALING WITHIN A VACUUM SYSTEM AND THE PARTICULAR CONFIGURATION OF THE DEVICE GIVING A LARGE VALUE OF SURFACE-TO-VOLUME RATIO. THE REQUIREMENT OF A LOW WORKFUNCTION SURFACE FOR THE ANODE WAS VERIFIED BY A TEST INVOLVING CHANGING THE INTERELECTRODE SPACING OF A CONVERTER IN SITU WITHIN THE PROCESSING SYSTEM. CONVERTER ACTION WAS OBTAINED WITH A SPACING OVER AN INCH, BUT DECREASED WITH SPACING. IT WAS NOTED THAT AT CLOSER SPACINGS THE OUTPUT POWER INCREASES AND THE INTERNAL RESISTANCE DECREASES. CONSIDERATION OF THE SUBSEQUENT INVENTION AND DEMONSTRATION OF THE CADMIUM SULPHIDE SOLAR POWER CONVERTER AT RELATIVELY HIGH CONVERSION EFFICIENCIES AND IN A THIN, FLEXIBLE, POLYCRYSTALLINE FILM FORM LEADS TO THE CONCLUSION THAT THE PHOTOEMISSIVE CONVERTER IS NO LONGER COMPETITIVE (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 293 856

NAVAL RESEARCH LAB WASHINGTON D C

DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS (U)

DEC 62 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *FUEL CELLS, *MAGNETOHYDRODYNAMICS, *SOLAR CELLS, *THERMIONIC EMISSION, *THERMOELECTRICITY, ABSTRACTS, AUXILIARY POWER PLANTS, BIBLIOGRAPHIES, BIOCHEMISTRY, ELECTROCHEMISTRY, ENERGY, ENERGY CONVERSION, NUCLEAR POWER PLANTS, PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOTUBES, POWER SUPPLIES, PRIMARY BATTERIES, STORAGE BATTERIES (U)

Contents: Energy conversion (general information, bibliographies, patents) Thermoelectricity (general information, theory, related phenomena, materials, design, applications) Thermionic emission (general information, theory, electrode properties, plasma properties, design parameters, devices, systems) Photoelectric process (photovoltaic, photoemissive, high energy processes) Magnetohydrodynamics (general information, principles, plasma properties, devices) Electrochemical processes (fuel cells, primary batteries) Energy storage (general information, chemical) Energy sources (chemical fuels, nuclear, solar collection and concentration) Regulation and control (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 288 650

NATIONAL RESEARCH CORP CAMBRIDGE MASS

DEVELOPMENT OF A PHOTOEMISSIVE SOLAR ENERGY CONVERTER

SEP 62 1V FOWLER, PETER; KOLLER, LEWIS R; SCHRANK, MARTIN P.;
REPT. NO. TDR62 600
CONTRACT: AF33 616 8145
MONITOR: ASD TDR62 600

(U)

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *SATURABLE REACTORS, *SOLAR RADIATION, DIELECTRICS, ETHYLENES, PHTHALATES, SIMULATION, SOLAR CELLS, SPACE FLIGHT, SUN, WORK FUNCTIONS (U)

DEVELOPMENT OF A PHOTOEMISSIVE SOLAR ENERGY CONVERTER.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 286 578

FCREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

SOLAR BATTERIES OF THE FUTURE

SEP 62 1V KOLTUN, M.;
REPT. NO. TT 62 972

(U)

UNCLASSIFIED REPORT

DESCRIPTORS: *FUEL CELLS, *POWER SUPPLIES, *SOLAR CELLS, *SOLAR RADIATION, INTERMETALLIC COMPOUNDS, PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOTUBES, SILICON (U)

The conversion of helioenergetics into an independent and important technological field is discussed. Outstanding scientists of the world, including Frederic Joliot-Curie, feel that helioenergetics will be put on an equal footing with the study of atomic energy. In this connection scientists await further research. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 285 084

DEPUTY COMMANDER AEROSPACE SYSTEMS INGLEWOOD CALIF

ENERGY CONVERSION RESEARCH PROGRAM. DIRECT CONVERSION
OF CHEMICAL ENERGY TO ELECTRICAL ENERGY (U)

AUG 62 1V HESS, F.D.; MAYER, S.W.;

REPT. NO. TDR62 164

CONTRACT: AF04 695 69

MONITOR: DCAS TDR62 164

UNCLASSIFIED REPORT

DESCRIPTORS: *FUEL CELLS, *POWER SUPPLIES, *SOLAR CELLS, ACETAMIDES, ANTIMONY COMPOUNDS, CHLORIDES, CHLORINE, DIELECTRIC PROPERTIES, ELECTRIC POTENTIAL, ELECTROCHEMISTRY, ELECTRODES, ENERGY CONVERSION, METHYL RADICALS, ORGANIC SOLVENTS, OXIDATION, PHOSPHORUS COMPOUNDS, REACTION KINETICS, TUNGSTEN COMPOUNDS (U)
IDENTIFIERS: METHYL RADICALS (M)

Prototype fuel cells were operated employing chlorine as oxidant, phosphorus trichloride as fuel, and methyl thiocyanate as solvent. Studies were made of pyrolytic processes for regeneration of reaction products and means of separating products. Other systems were investigated by chronopotentiometric techniques. Tungsten and antimony chlorides were found to have characteristics of special interest. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 282 718

GENERAL ELECTRIC CO WEST LYNN MASS

VOLTAGE REGULATION AND POWER STABILITY IN
UNCONVENTIONAL ELECTRICAL GENERATOR SYSTEMS (U)

MAR 61 139P

CONTRACT: N0w-60-0824

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *FUEL CELLS, *GENERATORS, *POWER SUPPLIES, *THERMIONIC EMISSION, *THERMOELECTRICITY, *VOLTAGE REGULATORS, CIRCUITS, CONTROL SYSTEMS, DESIGN, DIRECT CURRENT, ELECTRIC POTENTIAL, ELECTRICAL IMPEDANCE, INVERTER CIRCUITS, INVERTERS, SOLID STATE PHYSICS, SOURCES, SWITCHING CIRCUITS, TESTS, THERMIONIC CONVERTERS, TRANSISTORS (U)

Research continued on voltage regulation and power stability in unconventional electrical generator systems. Test data on the internal impedance characteristics of a fuel cell are presented. Steady state volt-ampere characteristics of both thermoelectric and thermionic generators are given. An analysis of seriesparallel switching methods of voltage control is included. The results to date of a survey of applicable power conversion circuits using power transistors and silicon controlled rectifiers is given. Progress to date in the experimental investigation of efficient power conversion circuits using an input voltage of one volt is presented. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 282 213

GENERAL DYNAMICS SAN DIEGO CALIF GENERAL ATOMIC DIV
 FLAT-PLATE SOLAR THERMOELECTRIC CONVERSION
 PANELS.

(U)

DESCRIPTIVE NOTE: Final rept., Nov 60-Dec 61,
 MAY 62 47P Himle, Arthur N.; Brush,

Daniel S.;

REPT. NO. TDR62 214

CONTRACT: AF33 616 7676

PROJ: 8173

MONITOR: ASD TDR62 214

UNCLASSIFIED REPORT

DESCRIPTORS: (*THERMOELECTRICITY), (*POWER SUPPLIES),
 (*SANDWICH PANELS), ALUMINUM, LEAD COMPOUNDS,
 TELLURIDES, ZINC COMPOUNDS, ANTIMONIDES, SOLAR
 ENERGY

IDENTIFIERS: SOLAR ENERGY, ANTIMONIDES
 (U)
 (M)

Procedures were developed for constructing a lightweight solar energy converter, using thermoelectric materials sandwiched between flat sheets of aluminum. Two panels, each one foot square, have been delivered to the Flight Accessories Laboratory, Aeronautical Systems Division. Each panel contains 153 n-type PbTe elements and 153 p-type ZnSb elements, arranged in eighteen alternating rows of seventeen elements each. According to measurements made on test panels constructed in a similar fashion, the delivered panels are capable of an output of at least 1.33 w/sq ft when subjected to an incident energy of 1400 w/sq m, which is equal to the solar energy intensity at the Earth's distance from the sun. At this output, the solar panel weight 96 pounds per electricia kilowatt. The observed output is lower than is calculated from the properties of the materials used; however, it is anticipated that improved performance can be obtained in future panels. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 274 922

GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE
 DIV

TEMPERATURE CONTROL TECHNIQUE FOR SOLAR ENERGY
 CONVERTERS

(U)

DESCRIPTIVE NOTE: Final rept.

FEB 62 189P

BAKER, JOEL K.;

CONTRACT: AF33 616 7889

PROJ: AF-3134

TASK: 60959

MONITOR: ASD TR61 689

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *SOLAR CELLS,
 *SOLAR RADIATION, ARSENIDES, COATINGS GALLIUM
 COMPOUNDS, MEASUREMENT, POWER SUPPLIES, SATELLITES
 (ARTIFICIAL), SILICON, SPACECRAFT, TEMPERATURE
 CONTROL

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 273 551

GOODYEAR AEROSPACE CORP AKRON OHIO

SOLAR ORIENTING DEVICE FOR EXPANDABLE FLAT-PANEL
ARRAY (U)

JAN 62 1V MCKEEL,G.J.;

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *SOLAR CELLS,
DESIGN, DETECTION, ENERGY CONVERSION, FEASIBILITY
STUDIES, FOCUSING, POWER SUPPLIES, ROTATING STRUCTURES,
SENSITIVITY, SOLAR RADIATION, SUN, TESTS, THERMAL
RADIATION, TRACKING (U)
IDENTIFIERS: ROTATING STRUCTURES (M)

The effects of solar declination change on the total angular error of the array and the position for mounting the sun sensor are treated. Curves of total angular error versus declination change for various values of the tracking drive error are presented. An example is outlined for calculating the possible period of unattended operation of the solar orienting device and its array for a particular set of initial conditions which contain a constant declination value. The tracking rate for the array is examined to obtain an insight into some of the important parameters affecting its operation. The requirements for automatic declination control applicable to the solar orienting device were examined, and a feasible approach to the sensor is presented. A circuit diagram illustrates the additional hardware needed for two-axis automatic control. Sensor modification is discussed for the purpose of removing the dead zone which, under certain tracking conditions, can occur. Experimental results gained from the breadboard model of the mount and drive unit are given, and the sun sensor accuracy is also obtained. Photographs of the breadboard mount and sun sensor are included. (U)
(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 271 829

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

A MOTOR CONNECTED TO THE SUN (U)

FEB 62 1V YEFIMOV,YE.;

UNCLASSIFIED REPORT

DESCRIPTORS: *SOLAR CELLS, ELECTRIC POWER PRODUCTION,
ENERGY CONVERSION, POWER SUPPLIES, SOLAR RADIATION,
THERMAL RADIATION, THERMOELECTRICITY (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 270 759

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

DIRECT CONVERSION OF THERMAL POWER TO ELECTRICAL
POWER (U)

JAN 62 1V MORGULIS,N.D.:
REPT. NO. TT 61 226

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *POWER
SUPPLIES, HEAT, HIGH TEMPERATURE, MAGNETOHYDRODYNAMICS,
PLASMAS(PHYSICS), THERMAL RADIATION, THERMIONIC
EMISSION, THERMOELECTRICITY (U)

An all-out increase in the efficiency of electrical power installations having various capacities and purposes is the most important problem of modern power engineering. At the same time, new problems require the development of some type of device for cosmic rockets, artificial satellites, etc. All these considerations require the development of new, more effective methods acceptable for various purposes of converting thermal (nuclear) energy into electrical energy. Investigations in recent years, which still have a very limited laboratory and prototype nature, showed that in solving the problem of the direct conversion of thermal energy to electrical there are completely new methods which use 2 direct (thermoelectric and thermionic) and 1 semi-direct (magnetogasdynamical) methods. These 3 methods are briefly examined. (Author) (U)

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AD- 269 892

NAVAL RESEARCH LAB WASHINGTON D C

DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS (U)

AUC 61 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *BIBLIOGRAPHIES, *ENERGY,
*MAGNETOHYDRODYNAMICS, *POWER SUPPLIES, *SOLAR CELLS,
*THERMOELECTRICITY, CONVERSION RATIO, ELECTROCHEMISTRY,
FUEL CELLS, NUCLEAR ENERGY, PHOTOELECTRIC CELLS
(SEMICONDUCTOR), PHOTOELECTRIC EFFECT, PHOTOTUBES,
PRIMARY BATTERIES, SOLAR RADIATION, STORAGE BATTERIES,
THERMIONIC EMISSION (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 267 330

TRW INC CLEVELAND OHIO

DESIGN STUDY FOR ADVANCED SOLAR THERMIONIC POWER SYSTEMS. ITEM II. PART I. VAPOR TYPE THERMIONIC GENERATOR

(U)

SEP 60 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *SOLAR CELLS, *THERMIONIC EMISSION, CESIUM, DESIGN, ELECTRIC POWER PRODUCTION, ENERGY CONVERSION, GENERATORS, PLASMAS(PHYSICS), POWER SUPPLIES, SOLAR RADIATION, THERMIONIC CONVERTERS, THERMOELECTRICITY, VAPORS

(U)

A survey of the state of the art of thermionic power generation was carried out as part of a design study for advanced solar thermionic power systems. The results are reported and serve as a basis for the preparation of a detailed design and test specification for two laboratory test models of thermionic generators. Part I of the report pertains to the Vapor Type Thermionic Generator, and Part II (AD-260 066) pertains to the Close-Spaced Vacuum Thermionic Generator. Part I describes the results of a design study on vapor type thermionic converters and establishes the design and test specifications for a laboratory test model Cs thermionic converter. The unit is rated at 28 volts, 250 watts electrical power output and consists of 2 identical Cs converters connected in series. The series combination voltage of 2.8 volts is converted to the specified 28 volts by an 80% efficient dc-dc transistorized converter. The gross power output from each Cs converter is 156 watts.

(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 264 828

WESTINGHOUSE ELECTRIC CORP BALTIMORE MD

PHOTOEMISSION SOLAR ENERGY CONVERTER

(U)

JUL 60 1V

REPT. NO. 3845 2

CONTRACT: DA36 039SC85248

MONITOR: ARPA 80 59

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *SOLAR CELLS, DESIGN, ELECTRODES, ELECTRON OPTICS, GENERATORS, PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOELECTRIC EFFECT, PHOTOTUBES, PROCESSING, SOLAR RADIATION, SPACE FLIGHT, TESTS

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 259 880

GENERAL ELECTRIC CO SCHENECTADY N Y

RESEARCH ON THERMIONIC CONVERTERS

(U)

JUN 61 1V

CONTRACT: AF19 604 5472
MONITOR: A-CRL 430

UNCLASSIFIED REPORT

DESCRIPTORS: *POWER SUPPLIES, *THERMIONIC EMISSION, ANODES, CATHODES, CERAMIC MATERIALS, CESIUM, ELECTRIC FIELDS, ELECTRIC POWER PRODUCTION, ELECTRICITY, ELECTRONS, GAS IONIZATION, GENERATORS, HEAT ENGINES, MAGNETIC FIELDS, MATERIALS, PLASMAS(PHYSICS), SCIENTIFIC RESEARCH, SINGLE CRYSTALS, SPACE CHARGE, TANTALUM, TESTS, THERMIONIC CONVERTERS, VACUUM APPARATUS, VAPORS (U)

Thermionic conversion involves the generation of electricity from thermal energy utilizing the phenomenon of thermionic emission of electrons, and requires no moving parts. Three basically different types of converters were the subjects of wide study: (1) vacuum converters which have now been developed to the product design stage for cathode temperatures in the range of 1100 to 1150 C, anode temperatures 600 to 700 C and electrical power outputs of 0.2 watt/ sq cm (min.) at an efficiency of 2.5%; (2) vapor converters which have been developed for solar space power with an efficiency of 15% at a cathode temperature of 1800 C; and (3) crossed-field converters which utilize a combination of electric and magnetic fields to direct the electron flow from cathode to anode in the converter. This particular line of development did not appear to be fruitful, and further work was not recommended on the crossed-field approach. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 257 788

ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

ENERGY CONVERSION SYSTEMS REFERENCE HANDBOOK. VOLUME V. DIRECT SOLAR CONVERSION

(U)

SEP 60 1V EVANS, W. MENETREY, W. R.;
REPT. NO. 390 F V5
CONTRACT: AF33 616 6791

UNCLASSIFIED REPORT

DESCRIPTORS: *HANDBOOKS, *PHOTOELECTRIC CELLS (SEMICONDUCTOR), *PHOTOELECTRIC EFFECT, *PHOTOTUBES, *POWER SUPPLIES, *SOLAR CELLS, *SOLAR RADIATION, CONFIGURATION, COOLING, CRATERING, DESIGN, DIRECT CURRENT, EFFECTIVENESS, ELECTROMAGNETIC RADIATION, ENERGY CONVERSION, GENERATORS, GEOMETRY, MATERIALS, METEORITES, MIRRORS, PLASMAS(PHYSICS), PRODUCTION, SPACE ENVIRONMENTS, SPACE FLIGHT, TEMPERATURE CONTROL, THEORY, VAN ALLEN RADIATION BELT (U)

The performance characteristics are described of the photovoltaic converter when used to convert solar radiation directly to dc electrical energy. Empirical and analytical relationships are derived which present expected efficiencies of conversion as a function of temperature, solar insolation, magnetic waves, Theory, Materials, Cratering, Configuration, Production. Open-ended Terms: Energy conversion. The performance characteristics are described of the photovoltaic converter when used to convert solar radiation directly to dc electrical energy. Empirical and analytical relationships are derived which present expected efficiencies of conversion as a function of temperature, solar insolation, and other factors. The effects of environmental degradation due to meteoroids and the Van Allen belts are discussed. The present and anticipated state-of-the-art of fabrication techniques is presented, along with the advantages of using concentrating mechanisms for increasing the solar illumination level. A discussion is also included describing the state of the art and practical and theoretical limitations of the photo-emissive generator. It does not appear at present that the photo-emissive generator offers competition to the photovoltaic cell. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 257 357

ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

ENERGY CONVERSION SYSTEMS REFERENCE HANDBOOK. VOLUME
I - GENERAL SYSTEM CONSIDERATIONS (U)

SEP 60 1V

MENETREY, W.R.; FISHER, J.H.;

REPT. NO. 390 F V1

CONTRACT: AF33 616 6791

UNCLASSIFIED REPORT

DESCRIPTORS: *HANDBOOKS. *POWER SUPPLIES. *SPACE ENVIRONMENTS. *SPACE FLIGHT. ANALYSIS. COSTS. CRATERING, DESIGN, EFFECTIVENESS. ELECTROMAGNETIC RADIATION, ENERGY CONVERSION, FUEL CELLS, GUIDED MISSILES, HYPERSONIC VEHICLES, LUNAR PROBES, MATERIALS, METEORITES, NUCLEAR ENERGY, PARTICLES, RELIABILITY, SATELLITES (ARTIFICIAL), SOLAR RADIATION, SPACECRAFT, STORAGE BATTERIES, THERMOELECTRICITY, VAN ALLEN RADIATION BELT (U)
IDENTIFIERS: HYPERSONIC VEHICLES (M)

An introduction is presented to subsequent volumes dealing with specific areas of power system technology. General topics useful in evaluating and rating power systems are discussed including the space environment and its effects; reliability considerations in systems design; figures of merit and their use in system evaluation; power needs of the future and the importance of developing power systems; and an estimate of expected system weights. Environmental effects include meteoroid bombardment, interplanetary and Van Allen corpuscular radiation, electromagnetic solar radiation, and vacuum. It is shown that the effort needed to guarantee high power system reliability may be too costly. The relative position of nuclear, chemical, and solar power systems in a power level-mission duration continuum is presented.
(Author)

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AD- 256 973

ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

ENERGY CONVERSION SYSTEMS REFERENCE HANDBOOK. VOLUME
II, SOLAR-THERMAL ENERGY SOURCES (U)

SEP 60 1V

MCCLELLAND, D.H.; STEPHENS, C.W.;

REPT. NO. 390 F V2

CONTRACT: AF33 616 6791

UNCLASSIFIED REPORT

DESCRIPTORS: *HANDBOOKS. *POWER SUPPLIES. *SOLAR RADIATION, ABSORPTION, COATINGS, COLLECTING METHODS, CONFIGURATION, DESIGN, ENERGY CONVERSION, HEAT, LENSES, MATERIALS, MIRRORS, OPTICAL EQUIPMENT, OPTICAL MATERIALS, PROCESSING, REFLECTORS, SATELLITES (ARTIFICIAL), SPACE ENVIRONMENTS, SPACE FLIGHT, SPACECRAFT, STORAGE, TESTS, THERMOCHEMISTRY (U)

Basic problems in the development of lightweight, high efficiency, solar concentrating mirrors for space power systems are discussed. Various concentrator and absorber configurations are compared both on the basis of idealized performance and in regard to performance degradation due to geometric errors. Concentrator structural design classifications are presented and are related to fabrication techniques, materials, and reflective surfacing methods. Orientation requirements and the effects of the space environment are considered. Tests are presented for determining collector performance and for evaluating mirror surface quality. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM07

AD- 256 916

ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

ENERGY CONVERSION SYSTEMS REFERENCE HANDBOOK. VOLUME
XI. RADIOISOTOPE SYSTEM DESIGN (U)

SEP 60 1V
REPT. NO. 390 F V11
CONTRACT: AF33 616 6791

UNCLASSIFIED REPORT

DESCRIPTORS: *NUCLEAR POWER PLANTS, *POWER SUPPLIES,
*RADIATION HAZARDS, *SATELLITES (ARTIFICIAL), *SPACE
PROBES, *SPACECRAFT, AUXILIARY POWER PLANTS, DESIGN,
ELECTRICITY, ELECTROMECHANICAL CONVERTERS, ENERGY,
FUELS, GENERATORS, HANDBOOKS, HEAT EXCHANGERS, HEAT
TRANSFER, ISOTOPE AVAILABILITY, PROCESSING, RADIOACTIVE
ISOTOPES, RELIABILITY, SOLAR CELLS, SOLAR RADIATION,
SOURCES, THERMOCOUPLES, THERMOELECTRICITY (U)

The Martin Company in Baltimore, has been engaged in extensive research and development work on isotopic-powered generators. A description is presented of their work in basic technology, radiation safety, and specific equipment design. Basic work includes methods of preparation and containment of fuels, energy conversion systems, and generator design principles. Prevailing concern over radiological hazard is answered by discussion of each possible hazard situation from ground handling to various vehicle missions, including aborts. Five practical generator designs are presented including SNAP IA, a 125-watt, one-year generator using Cerium144, and the Polonium-fueled SNAP III, both of which have progressed to the advanced hardware stage. A comparison of nuclear- and solarpowered generators indicates some advantage for the nuclear device for requirements of less than 1 kwe when the mission involves long periods of flight away from the sun. (Author) (U)

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AD- 256 881

GARRETT CORP LOS ANGELES CALIF AIRESEARCH MFG DIV

ENERGY CONVERSION SYSTEMS REFERENCE HANDBOOK. VOLUME
VII. HEAT EXCHANGERS (U)

SEP 60 1V
HAIRE, A.; HAYS, L.;
UNCLASSIFIED REPORT

DESCRIPTORS: *HANDBOOKS, *HEAT EXCHANGERS, *HEAT
TRANSFER, *POWER SUPPLIES, BOILERS, COATINGS,
CONVECTION, DESIGN, ELECTRICAL CONDUCTIVITY, ENERGY
CONVERSION, FLUID MECHANICS, LIQUID METALS, MATERIALS,
MATHEMATICAL ANALYSIS, NUCLEAR ENERGY, REFLECTION,
SATELLITES (ARTIFICIAL), SOLAR RADIATION, SPACE
ENVIRONMENTS, SPACE FLIGHT, SPACECRAFT, STEAM
CONDENSERS, THEORY, THERMAL RADIATION, TURBINES
IDENTIFIERS: SNAP (U)
(U)

Empirical and analytical equations are presented describing the performance of several types of heat exchangers useful in space power systems, including non-phase-change heat exchangers, condensers, boilers, sub-cooling mechanisms, and others. The present state-of-the-art concerning materials compatibility, fabrication techniques, knowledge of environmental deterioration, and other factors is presented. Anticipated weights and practical difficulties encountered in systems operation are discussed. (Author) (U)

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AD- 256 748

ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

SEP 60 1V

REPT. NO. 390 F

CONTRACT: AF33 616 6791

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DESCRIPTORS: *HANDBOOKS, *POWER SUPPLIES, *SOLAR CELLS, *SOLAR RADIATION, *THERMIONIC EMISSION, *THERMOELECTRICITY, COSTS, DESIGN, ELECTROCHEMISTRY, ENERGY CONVERSION, GENERATORS, HEAT ENGINES, PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOTUBES, RELIABILITY, SATELLITES (ARTIFICIAL), SPACE ENVIRONMENTS, SPACE FLIGHT, SPACECRAFT, STORAGE BATTERIES, THEORY, THERMOCOUPLES, TURBINES (U)

A summary is given of the anticipated performance of solar power systems over the next decade. This summary is based upon the analytical and empirical relationships describing component performance. Weight, cost, and reliability estimates are presented for photovoltaic power systems, and weight estimates are given for solar-thermal systems. Thermal converters include thermoelectric discs, thermionic emitters, turbo-generators, and the Stirling engine. (Author) (U)

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AD- 256 701

ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

ENERGY CONVERSION SYSTEMS REFERENCE HANDBOOK. VOLUME III. DYNAMIC THERMAL CONVERTERS (U)

SEP 60 1V

STEPHENS, C.W.; SPIES, R.; MENETREY, W.R.;

REPT. NO. 390 F

CONTRACT: AF33 616 6791

UNCLASSIFIED REPORT

DESCRIPTORS: *HANDBOOKS, *HEAT ENGINES, *POWER SUPPLIES, *TURBINES, AXIAL FLOW TURBINES, DESIGN, EFFECTIVENESS, ELECTRIC POWER PRODUCTION, ELECTROMAGNETISM, ELECTROMECHANICAL CONVERTERS, ELECTROSTATIC GENERATORS, ENERGY, ENERGY CONVERSION, GAS TURBINES, GENERATORS, MATERIALS, SOLAR RADIATION, SPACE FLIGHT, STEAM TURBINES, THEORY, THERMODYNAMICS, VAN DE GRAAFF GENERATORS (U)

IDENTIFIERS: SNAP (U)

A detailed discussion is presented of the two dynamic thermal converters which appear most useful in future power systems in the next decade, the Stirling engine and the Rankine cycle turbine. Empirical and theoretical equations are presented describing engine performance, and estimates are made of future performance possibilities with new working fluids, higher operating temperatures, etc. Also discussed are electrostatic and electromagnetic generators which are coupled with the dynamic thermoconverters. Anticipated weights, efficiencies and other performance characteristics are described. (Author) (U)

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CORPORATE AUTHOR - MONITORING AGENCY

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PLASMA KINETIC ENERGY-RF
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*ADVANCED RESEARCH PROJECTS AGENCY
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(FRANCE)

AGARD-OGRAPH-81
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AGARD-OGRAPH-122
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ASJ-TDR62 214
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ASD-TDR62 600
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AD-A004 814

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Cesium Amalgam Vapor Jet.
AD-A004 813

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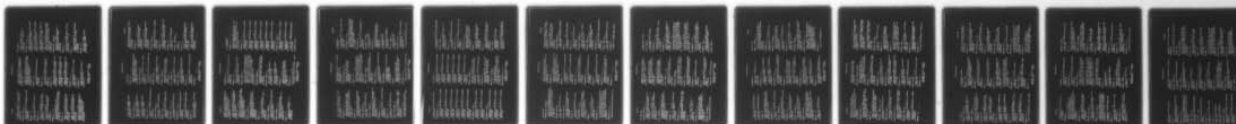
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